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A

SYSTEM

OF

SURGERY:

BY

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A

SYSTEM

OF

SURGERY.

CHAPTER XI.

Of the Diseases of the Eyes.

SECTION I.

Anatomical Description of the Eye.

THE object of this chapter is the chirurgical treatment of the diseases of the eye and parts with which it is connected: Hence it will comprehend the diseases of the lachrymal passages; but, in the *first* place, it will be proper to give an

anatomical deſcription of the parts in which theſe diſeaſes are ſeated.

Minuteneſs on this ſubject would lead to a greater length than the extent of this work will admit, nor does it appear to be neceſſary: I ſhall therefore give only ſuch an account of theſe parts, as the nature of the diſeaſes, and the operations to be deſcribed, ſeem to require.

The eyes, and part of their appendages, are placed in two bony cavities, termed the Orbits, formed by a conjunction of the inferior part of the frontal bone with ſeveral other bones of the head and face; namely, with the oſſa maxillaria, oſſa malarum, oſſa unguis, os ethmoides, os ſphenoides, and oſſa palati. All the upper part of the orbits is formed by the orbitar proceſſes of the frontal bone; and the ſame proceſſes form a conſiderable vacuity in each orbit towards the external canthus of the eye, in which the glandula lachrymalis is lodged. The inferior part of the orbits is formed by the oſſa maxillaria and oſſa malarum, which alſo form part of the

ſides

ſides or angles of each orbit; the former ſtretching towards the internal canthus, and the latter towards the external angle of the eye. The bottom or back-part of each orbit is formed by the ethmoid, ſphenoid, and a ſmall portion of the palate bones; and a ſmall part of the internal corner or angle of each orbit is filled up by the os unguis.

As this laſt-mentioned bone, the os unguis, is frequently the ſubject of a nice operation, it is more particularly neceſſary for ſurgeons to be well acquainted with its ſtructure and ſituation. A conſiderable part of it is ſo thin and brittle, that a perforation may be made in it with very little force; with leſs, indeed, than is commonly imagined; for not being thicker than fine paper, the point of a ſharp inſtrument is eaſily made to paſs through it. The internal ſurface of the os unguis, which in part covers the cells of the ethmoid bone, is ſomewhat rough; but its external ſurface is ſmooth, and conſiſts of two depreſſions or con-

cavities divided by a ridge. This ridge forms the boundary of the orbit at the internal canthus of the eye, and one of theſe depreſſions forms the very point or angle of the orbit; while the other concavity, which lies between this ridge and the naſal proceſs of the maxillary bone, ſerves to lodge in its upper part, where it is largeſt, the lachrymal ſac, and below it protects the duct leading from this ſac into the noſe, where it terminates immediately below the ſuperior edge of the lower os ſpongioſum. The naſal duct of the lachrymal ſac admits a probe of the ſize of a crow's quill; and it continues of this diameter till within a little of its termination in the membrane of the noſe; where, by running in an oblique direction between the layers of this membrane, in a manner ſimilar to the termination of the ureters in the bladder, it is in general found contracted to a very narrow point.

The principal part of each orbit is filled by the Ball or Globe of the eye, a body compoſed of ſeveral membranes or coats,

coats, incloſing fluids or liquors of different conſiſtences, improperly termed the Humours of the eye.

Anatomiſts have conſidered the coats of the eye as numerous, but three only can be diſtinctly traced; namely, the Sclerotic, the Choroid, and the Retina. The former has indeed been ſuppoſed to conſiſt of different coats, to all of which names have been appropriated, namely, The tunica albuginea, the cornea opaca, cornea lucida, &c.; and even the choroid has been ſuppoſed to be formed of different tunics: But although a tedious maceration may ſeparate ſome of theſe parts into different lamellæ, the knife of the anatomiſt is not able to do ſo; and as diſtinctions of this kind can tend to no uſeful purpoſe, they ought not to be retained.

The fat and different muſcles of the eye being ſeparated from it, the ſclerotic is the firſt coat that preſents itſelf; and it is found to ſurround the whole globe of the eye, which is not the caſe with any

of the others. In the anterior convex part of the eye, which in a healthy ſtate is always tranſparent, this membrane is in general termed the Cornea. The poſterior part of it is thick, ſtrong, and perfectly opaque: It is this part of it that has commonly been termed the Sclerotic Coat, or, as I have already obſerved, the Opaque Cornea. But although the tranſparent cornea can be eaſily ſeparated into different layers, which cannot be ſo readily done with the other; a circumſtance which has led ſome anatomiſts to conſider them as diſtinct coats; yet as the one is evidently a continuation of the other, and as they are both ſupplied with the ſame blood-veſſels, there ſeems to be no good reaſon, as I have juſt remarked, for the diſtinction being retained.

All the opaque part of the ſclerotic coat is lined with the ſecond coat of the eye, the choroides; a dark, or duſky red coloured membrane, which every where adheres to it with firmneſs, particularly at a ſmall diſtance behind the commence-

ment

ment of the tranſparent cornea, where a circular whitiſh ring is formed by this junction of the choroides with the ſclerotica, commonly termed the Ligamentum Ciliare. From this junction of the choroid with the ſclerotic coat, a perforated kind of curtain or ſeptum is produced, which from the variety of its colours, is termed the Iris. The perforation in the centre of this membrane is termed the Pupil, and ſerves to admit the rays of light to the bottom of the eye.

Towards the middle of the iris, we perceive a number of radiated lines running from the circumference to the centre: Theſe are denominated the ciliary proceſſes, and on their action the contraction and dilatation of the pupil appear to depend; for it ſeems to be doubtful, whether any circular fibres exiſt in the iris or not.

Ruyſch, as well as other anatomiſts, have imagined, that the tunica choroides conſiſts of two diſtinct coats, and the iris

has been in general conſidered as a continuation of one of theſe; but later diſcoveries tend to ſhew that the choroides in the human eye conſiſts of one ſimple indiviſible tunic, and that it is different in every reſpect from the iris.

The third and moſt internal coat of the eye is the Retina, which ſeems to be an expanſion of the optic nerve. It does not line the whole cavity of the eye, but appears to terminate over the anterior edge of the ſac or capſule of the vitreous humour to be hereafter deſcribed.

Viſion we ſuppoſe to be produced by the rays of light being applied in a certain manner to the retina: It is therefore obvious, that a ſound ſtate of the optic nerve, by which this membrane is produced, is highly neceſſary for the purpoſes of viſion, and we conclude with much probability, that the nerve is ſound, when the uſual contraction and dilatation of the pupil take place on light being applied to, or removed from, the eye: For in a healthy ſtate of this organ, ſuch a connection

connection ſubſiſts between the optic nerve and the iris, that the latter always contracts or dilates, juſt in proportion to the quantity of light thrown upon the other.

Theſe are the only proper coats or coverings of the eye; but there are two membranous expanſions which likewiſe cover a conſiderable portion of the back part of the globe, which by many have been enumerated as part of its tunics; namely, the albuginea, and tunica conjunctiva: The former, however, is formed entirely of the tendinous attachments of the muſcles of the eye; and the latter is a continuation or reflection of the membrane that lines the internal ſurface of the eyelids.

The cavity formed by theſe coats or membranes, is filled with three kinds of ſubſtances, or humours as they are commonly termed: Namely, the vitreous; the cryſtalline; and the aqueous. All the poſterior part of the eye is filled with the vitreous humour, which is perfectly tranſparent,

tranſparent, and of a gelatinous conſiſtence: This humour is completely ſurrounded by a very delicate membrane, which likewiſe appears to paſs through the ſubſtance of this gelatinous maſs, and to confine it in a kind of cellular texture or net-work. In the anterior ſurface of the vitreous humour, we find a depreſſion exactly oppoſite to the pupil, for the purpoſe of receiving the cryſtalline humour, a ſubſtance of a much firmer texture than itſelf, and of a rounded or lenticular ſhape. This body, or the Lens as it is commonly termed, is retained in its ſituation by a very fine membrane or capſule, which appears to be formed by the capſule of the vitreous humour, ſeparating or dividing at this part into two diſtinct laminæ. It has indeed been ſuppoſed, that the cryſtalline lens has a cyſt or capſule peculiar to itſelf; but I have never been able to diſtinguiſh it, nor has any ſufficient evidence ever been given of this having been done.

The

The whole anterior part of the eye, from the termination of the vitreous and cryſtalline humours, to the internal ſurface of the tranſparent cornea, is filled with the aqueous humour, a thin tranſparent fluid. By the iris, already deſcribed, this part of the eye is divided into two unequal departments: The ſmalleſt of theſe, which is ſcarcely a tenth of an inch in width, and lies between the iris and the capſule of the vitreous humour, is termed the Poſterior Chamber; and the other, which is conſiderably larger, and occupies the whole ſpace from the iris to the cornea, is called the Anterior Chamber of the eye. Although theſe two diviſions of the eye, however, are perfectly diſtinct, it is obvious that they muſt communicate at the pupil, the opening in the centre of the iris.

The muſcles of the eye are ſix in number; namely, the levator oculi, the depreſſor, adductor and abductor, the obliquus ſuperior and inferior. By theſe, all the motions of the eye are performed.—

The

The firſt five ariſe from near the bottom of the orbit, at no great diſtance from each other; and the laſt originate from the orbitar proceſs of the maxillary bone, near to its junction with the os unguis. They are all inſerted into the tunica ſclerotica, below the adnata or tunica conjunctiva.

The conſtant motion of the eye requiring it to be kept ſoft and moiſt, it is for this purpoſe plentifully ſupplied by a fine tranſparent fluid, the tears. This ſecretion is now known to depend in a great meaſure upon a large glandular body, the glandula lachrymalis, ſeated immediately above the eye, in the depreſſion that I formerly mentioned in the os frontis, near to the external angle of the orbit. There is likewiſe in the internal or great angle of the eye, a ſmall red coloured body, termed the Caruncula Lachrymalis, which till of late was ſuppoſed to be the principal origin of the tears. This, however, is not the caſe; and there is even reaſon to doubt

doubt whether this ſubſtance is of a glandular nature or not.

But although the tears are chiefly ſecreted by the glandula lachrymalis, there is much reaſon to imagine that they are partly produced by exſudations from the whole ſurface of the eye, as well as from the membrane of the eyelids. But this being in ſome meaſure foreign to our ſubject, I ſhall not at preſent conſider it further.

The eye, and its appendages, that have juſt been deſcribed, are ſupplied by ſeveral arterial branches, either directly from the internal carotid, or from the maxillary arteries. None of theſe, however, are of any conſiderable ſize; at leaſt, before reaching the eye, they are in general found divided into branches of no great magnitude; a circumſtance of ſome importance for practitioners to recollect: For, on the ſuppoſition of theſe arteries being larger than they are, ſurgeons have commonly been deterred from operating with that freedom on the eye which they otherwiſe

otherwiſe might do, particularly in the total removal or extraction of the eye-ball; an operation to be hereafter deſcribed. The veins of the eye terminate partly in the external, and partly in the internal jugular veins.

Viſion, as I have already obſerved, depends in a great meaſure on the optic nerve which paſſes in from the brain at the bottom of the orbit; but the eye does not depend entirely upon this nerve: It receives branches from ſeveral others, particularly from the fourth, fifth, and ſixth pairs.

The globe of the eye and other parts contained in the orbit, are covered by two very moveable membranes, called Palpebræ, or Eyelids, formed chiefly of the ſkin and a ſmooth fine membrane already deſcribed, the tunica conjunctiva, with an intermediate thin cartilaginous body termed Tarſus, on which the cilia or eye-laſhes are placed. Both the upper and under eyelids are ſupplied with this thin cartilage; at the extreme bor-

der

der of which, towards the roots of the cilia, a number of ſmall follicles are placed, named after their diſcoverer, the follicles or glands of Meibomius; from whence is poured out a viſcid ſebaceous matter, commonly termed the Gum of the eyes.

The motion of the eyelids is performed entirely by two muſcles, the orbicularis palpebrarum, and the levator palpebræ ſuperioris. The former is common to both the eyelids: It originates by a ſmall tendon at the inner angle of the eye, and by fine fleſhy fibres from the orbitar proceſs of the maxillary bone, and is inſerted by a ſmall round tendon into the naſal proceſs of the ſame bone. A few of the tendinous fibres of this muſcle are ſpread upon, and ſeem to be inſerted into, the anterior ſurface of the lachrymal ſac. The uſe of this muſcle is to draw the eyelids together, and to compreſs the eye-ball.

The levator palpebræ ſuperioris originates from the bottom of the orbit, and

is

is inſerted into the membranous and cartilaginous parts of the upper eyelid: The ſole uſe of this muſcle ſeems to be to raiſe this covering of the eye.

I have already deſcribed the lachrymal ſac and duct, by which the tears are conveyed to the noſe: We have now to attend to the manner in which they paſs from the eyes to the ſac. After the tears have moiſtened the eyes, they would at all times be falling over the cheeks, if not carried off in ſome other manner: A very beautiful mechaniſm, however, is employed by nature for this purpoſe.

Near to the internal angle of each eye, we perceive two ſmall points or protuberances, one on the border or edge of the upper eyelid, and the other exactly oppoſite to it on the under eyelid. In the centre of each of theſe there is a ſmall hole or opening, termed the Punctum Lachrymale, which we find to be the mouth of a ſmall conduit leading to the lachrymal ſac, and by which the tears are conveyed to it. Theſe canals are of

ſuch

ſuch a ſize as to admit a probe ſomewhat larger than a hog's briſtle. They are each about four-tenths of an inch in length; and after running in an oblique direction along the edge of the eyelids, they commonly join into one common trunk immediately before they enter the lachrymal ſac, ſomewhat more than the tenth of an inch below the upper end of it.

The protuberances on which theſe canals originate, are evidently irritable, as may readily be ſeen on their being touched with a probe or any acrid matter. This renders it probable that they are endowed with the power of abſorbing the tears; and this fluid we find is at all times applied to the mouths of them, by a kind of membranous production of the tunica conjunctiva, of a ſemilunar form, lying in the internal angle of the eye. This membrane is by anatomiſts termed Valvula Semilunaris. In order, however, to render the anatomy of theſe parts as intelligible as poſſible, a cir-

cumſtance of much importance in the treatment of the diſeaſes to which they are liable, I have given a delineation of the whole in Plate XII. fig. 1.

Being now prepared to enter on the conſideration of the diſeaſes of theſe parts, I ſhall proceed accordingly to this part of our ſubject.

Inflammation of the eye frequently occurs, and is productive of many other diſeaſes to which this organ is liable: I ſhall therefore enter firſt on the conſideration of this ſymptom, and ſhall afterwards treat of the following diſeaſes and operations peculiar to theſe parts: Wounds of the eyelids and eyeballs,—Tumors of the eyelids, ſuch as abſceſſes, melicerous and ſteatomatous collections and warts,—Inverſion of the cilia or eyelaſhes,—Everſion of the eyelids,—Concretion of the eyelids,—Fleſhy excreſcences on the cornea,—Abſceſſes in the globe of the eye,—Dropſical ſwellings of the eyeball,—Blood effuſed in one or both chambers of the eye,—Ulcers on the cornea,—

Specks

Specks or films on the tranſparent part of the eye,—Protruſion of the globe of the eye from the ſocket,—Cancerous affections of the eye, and extirpation of the eyeball, —Of artificial eyes,—Of cataracts, and the means of removing them by depreſſion and extraction,—Obliteration of the pupil, by concretion of its ſides and adheſion of the iris to the capſule of the cryſtalline and vitreous humours,—And, laſtly, of the fiſtula lachrymalis.

SECTION II.

Of Ophthalmia, or Inflammation of the Eyes.

THE eyes and their appendages, like every organiſed part of the body, are liable to inflammation; and the ſymptoms which it excites vary according to the particular ſeat of the diſeaſe. Thus the ſymptoms ariſing from inflammation of the retina and other deep-ſeated parts, are different from thoſe which proceed from inflammation of the external coverings of the eye; and theſe again are different from thoſe which ariſe from an inflamed ſtate of the eyelids.

The moſt frequent ſymptoms attending inflammation of the eyeball, are, a preternatural redneſs of the adnata, owing to a turgeſcent ſtate of the bloodveſſels; pain and heat over the whole ſurface of the eye, attended with a ſenſation of motes or extraneous bodies rubbing upon the

the eyeball, and in moſt inſtances a plentiful effuſion of tears. All theſe ſymptoms are increaſed by motion of the eye or of its coverings, and likewiſe by expoſure to light. We judge too of the depth of the inflammation by the degree of pain which expoſure to light excites. When the pain induced by light is ſevere, there is always cauſe to ſuſpect that the parts at the bottom of the eye, are inflamed; and again, when the pain is trifling; we conclude that the inflammation is confined to the external parts of the eye. We alſo find, when the inflammation is ſuperficial, that the ſymptoms are in general local, and confined entirely to the eye; but, when more deeply ſeated, ſevere ſhooting pains are frequently felt through the head, and fever very commonly revails.

During the whole courſe of the inflammation, there is for the moſt part a plentiful flow of tears, which frequently become ſo hot and acrid as to excoriate the neighbouring parts; but it often happens that, together with the tears, a conſider-

able quantity of yellow purulent-like matter is diſcharged; and, when the inflammation has either ſpread to the eyelids, or has been ſeated there from the beginning, as ſoon as the tarſi become inflamed, a diſcharge takes place of a viſcid glutinous kind of matter, which adds greatly to the patient's diſtreſs, as it tends to increaſe the inflammation, by cementing the eyelids ſo firmly together, as to render it difficult, particularly in the mornings, to open them.

Theſe are the appearances of inflamed eyes in the firſt ſtages of the diſeaſe; but when of long duration, it proceeds, like inflammation of other parts, to terminate either in ſuppuration, or in the effuſion of a fluid not convertible into pus. Inflammation of the eyes has alſo been known to terminate in mortification; but this is a rare occurrence; and we even know that it does not readily end in ſuppuration.

Inflammation of the eyes is induced by various cauſes: Whatever tends to produce inflammation in other parts, will be attended

attended with ſimilar effects, when applied to the eye; but the peculiar mechaniſm of this organ renders it liable to be acted on by cauſes which may with impunity be applied to other parts of the body. Thus, much expoſure to ſmoke tends often to induce inflammation of the eyes: And it alſo happens from the application of much light; particularly from much expoſure to the rays of the ſun; to the influence of a large fire; or to the effects of ſnow: And the introduction of lime, ſand, or any other extraneous body, between the eyelids and the eye, is very univerſally attended with this effect.

The conſequences, however, of theſe cauſes, are not in general permanent; for, in recent caſes, a removal of the cauſe is, in moſt inſtances, attended with the cure of the diſeaſe. It is that variety of inflammation which originates from diſeaſe of the ſyſtem that proves moſt obſtinate, and which is, therefore, moſt to be dreaded, particularly that which occurs from ſcrofula and lues venerea; for we find by

experience, that few ſymptoms in either of theſe diſeaſes prove ever ſo tedious as thoſe inflammatory affections of the eyes with which they are often attended. Whilſt a venereal or ſcrofulous affection ſubſiſts, it is in vain to expect a cure of any inflammation that may exiſt. Such remedies ought, therefore, to be employed as are known to prove moſt powerful for the removal of the diſeaſe of the ſyſtem, at the ſame time that we attend to the local treatment of the eyes. It is the management of this local affection that we are now to conſider.

In the treatment of inflamed eyes, the indications to be kept in view are, To remove any extraneous ſubſtances that might tend to excite irritation,—To diminiſh pain and irritability already induced,—To remove the turgeſcence of the blood-veſſels of the eyes,—And to prevent a return of the diſeaſe.

When inflammation is induced by ſand, or any other extraneous body acting on the eye, nothing will prove materially uſeful,

ful, till the cauſe of irritation is removed. With due pains, the eyelids may be ſo far ſeparated with the fingers alone, as to admit of a clear view being obtained of a conſiderable portion of the eyeball. But this will be more effectually done, if an aſſiſtant, either with his fingers alone, or by means of a flat curved hook, ſuch as is repreſented in Plate XIII. fig. 6. raiſes the upper eyelid, while the ſurgeon himſelf depreſſes the other. Any extraneous body diſcovered in this manner, may be taken out with the end of a blunt probe, covered with a bit of ſoft linen or ſilk; or, if any ſharp-pointed ſubſtance is fixed in the eye, it will be moſt eaſily removed with ſmall forceps.

It often happens, however, even when we are certain, from the feelings of the patient, as well as from other circumſtances, that the inflammation is kept up by ſome cauſe of this kind, that nothing is diſcovered on inſpection. In ſuch circumſtances, ſome advantage is often derived from injecting tepid water, or milk

and

and water, between the eyelids and eyes, by which ſand and duſt are often waſhed out, when they cannot be removed in any other manner: The eaſieſt and moſt effectual method of throwing in theſe liquids, is by means of a bag of elaſtic gum, fitted with a ſhort ivory pipe. With this bag, a ſurgeon can eaſily perform all that is neceſſary without aſſiſtance, which with a common ſyringe he cannot ſo readily do. One of theſe bags, properly mounted, is repreſented in Plate XIII. fig. 3.

In this manner, and by bathing the eyes frequently in warm water, they may, in general, be entirely cleared of all extraneous bodies: But, when the inflammation has ſubſiſted for ſome time, it often continues after the cauſe by which it was produced is removed; in which event, other remedies muſt be employed. When the pain is conſiderable, and the pulſe quick, full, or hard, it becomes neceſſary to take blood in proportion to the ſtrength of the patient. The bowels ſhould be

kept

kept open with briſk purgatives; a low diet ſhould be continued for a length of time, proportioned to the violence of the diſeaſe; the body ſhould be kept cool; light ſhould be excluded from the eyes, and they ſhould be conſtantly covered either with ſoft linen ſoaked in a weak ſaturnine ſolution, or with cataplaſms applied cold, compoſed of this ſolution and crum of bread. In this manner, very ſevere degrees of inflammation are often removed; but caſes frequently occur, which reſiſt theſe and all the remedies uſually employed.

In ſuch inſtances, we find, that diſcharging blood from the contiguous parts, or even from the bloodveſſels of the eye itſelf, proves ſometimes uſeful, when all other means have failed. When a large quantity of blood is to be diſcharged, it is done with moſt advantage from the jugular veins or temporal arteries; even the laſt of which, as I have already endeavoured to ſhow, may be opened with entire

tire ſafety *. In adviſing local blood-letting, we do it either from the parts contiguous to the eyes, or from the veſſels of the eyes themſelves; and the means we employ for it are, cupping and ſcarifying the temples, leeches applied as near as poſſible to the eyes, and ſcarifying the bloodveſſels of the eyeball or eyelids. The operation of cupping and ſcarifying, and likewiſe the method of applying leeches, have been already deſcribed †.

In a great proportion of caſes, an early and a plentiful diſcharge of blood from the temporal artery or jugular vein proves ſucceſsful; but, where ophthalmia is either deep ſeated, or of long duration, I have commonly found, that little advantage is derived from our taking blood in this manner, and that no remedy anſwers ſo well as a free diſcharge of blood from the veſſels of the inflamed eye. As this operation, however, the diviſion of the bloodveſſels of the eye, has always been conſidered

* Vide Chapter VIII. Sect. 8.

† Vide Vol. IV. Chap. VIII.

conſidered as nice and hazardous, it has ſeldom been practiſed; but any ſurgeon with a ſteady hand may perform it with ſafety, and without injuring the eye itſelf.

Various methods have been propoſed for dividing the veſſels of inflamed eyes. It has been attempted with a bruſh compoſed of the beards of barley; by drawing the ſharp ſpiculæ acroſs the part to be ſcarified, a number of veſſels are thus penetrated and divided. This was firſt put in practice by an Engliſh oculiſt, Mr Woolhouſe, about the beginning of this century, and it was conſidered as an improvement on the means which till then had been in uſe for the ſame purpoſe, from the days of Hippocrates and Celſus; which were, rubbing the parts to be ſcarified either with a piece of rough pumice-ſtone, or with the ſpiculæ of thiſtles, till the blood-veſſels were ſufficiently lacerated for diſcharging as much blood as was neceſſary. It has likewiſe been propoſed to raiſe or elevate the veſſels to be divided with

with the point of a needle, and then, with ſciſſars or a ſcalpel, to cut them acroſs.

All theſe modes, however, of ſcarifying the eye, proceed from timidity; they give much unneceſſary pain, and they do not anſwer ſo well as ſcarifications made with a ſharp cutting inſtrument. Practitioners have commonly been afraid of attempting this operation with an inſtrument of this kind; but any perſon accuſtomed to chirurgical practice, will find that it may be done both with eaſe and ſafety. In the hands of a ſteady ſurgeon, it may be done with the ſhoulder of a common lancet; but, with a view to prevent the eyelids from being injured by one edge of the inſtrument, while the eye is ſcarified with the other, I have delineated a ſmall knife in Plate XII. fig. 4. and another in Plate XXIII. fig. 5. with either of which the operation may be done with ſafety.

In this operation, two aſſiſtants are neceſſary, one to ſtand behind the patient, to ſupport his head, and the other to ſecure

cure his hands. This being done, the ſurgeon, ſtanding or ſitting before the patient, with the fore and middle finger of one hand ſhould ſeparate the eyelids, ſo as to expoſe as much of the eyeball as poſſible; whilſt, with the inſtruments I have mentioned in the other, all the turgid bloodveſſels ſhould be divided. This is moſt effectually done by paſſing the point of the inſtrument below the enlarged bloodveſſels, and thus cutting them from below upwards. In general, we wiſh to avoid the tranſparent cornea in this operation, and to confine the ſcarifications to the albuginea or cornea opaca; but when the veſſels of the tranſparent cornea are much diſtended, they may be divided with eaſe and ſafety. I have often found it neceſſary, to divide the veſſels of this part of the eye, and no inconvenience ever enſued from it.

On the inflamed bloodveſſels being cut, we ſhould endeavour to promote a diſcharge of their contents; for which purpoſe nothing anſwers ſo well as bathing the eye in

in warm water, either by means of an eye-cup, or with pieces of ſoft old linen, frequently immerſed in the water.

A plentiful diſcharge of blood from the veſſels of the eye often gives more relief in the pain ariſing from ophthalmia, than any other remedy we employ. But when it either does not ſucceed, or when not agreed to by the patient, opiates applied to the eye frequently anſwer. A few drops of a ſtrong ſolution of opium in water being dropped into the eye, prove ſometimes ſucceſsful; but the common laudanum of the diſpenſatories, particularly when wine is employed as the menſtruum, proves often effectual when the watery ſolution of opium has been uſed in vain

The pain ariſing from ophthalmia, as well as every other ſymptom which it excites, is frequently relieved by ſhaving the head, and waſhing it from time to time in cold water. Bliſters applied behind the ears, on the neck and temples, are in ſome inſtances uſed with advantage; alſo drains

drains, formed either by pea-iſſues, or with a cord in the nape of the neck.

In ſome ſtages of the diſeaſe, much diſtreſs is experienced from a thick viſcid ſecretion, that glues the eyelids together. This takes place in ſome degree in almoſt every caſe of ophthalmia, particularly in the mornings, and when the tarſi or extreme borders of the eyelids are much inflamed. In this caſe, indeed, the inflammation ſoon terminates in a number of ſmall ulcerations, which frequently may be diſtinctly ſeen round the whole circumference of the cartilaginous border of the eyelids.—From theſe this glutinous matter, which in ſome meaſure is produced by the ſebaceous glands of theſe parts, is poured out in great quantities; and unleſs ſome means are employed for curing the ulcers, ſcarcely any remedy will remove the inflammation of the eyes.

A ſmall portion of any emollient ointment, being from time to time inſerted between the eyelids, proves often uſe-

ful in preventing this viſcid matter from fixing them together; but the relief obtained in this manner proves only temporary. Some addition muſt be made to the emollient for the purpoſe of healing the ulcers from whence the matter is diſcharged, otherwiſe no permanent advantage enſues from it; and when the diſeaſe is local, and not connected with ſcrofula, the cure of the ulcers will commonly be followed by the cure of the inflammation by which they were produced. With this view, the calx of zinc, or lapis calaminaris finely levigated, may be added to an equal quantity of an emollient ointment compoſed of wax and oil; but no application proves ſo generally uſeful as ointments of the mercurial kind; and perhaps the beſt of theſe is the unguentum citrinum of the Edinburgh Diſpenſatory, mixed with an equal quantity of hogs-lard, and made ſoft with oil; or the blue mercurial ointment of different diſpenſatories, prepared with quickſilver and lard. One ounce of quickſilver,

quickſilver, triturated with four ounces of lard, is, for this purpoſe, a very uſeful remedy. Every night and morning the ulceration on the eyelids ſhould be covered with a little of this, at the ſame time that a ſmall portion of the ointment ſhould be inſerted between the upper and under eyelids, while a weak ſaturnine or vitriolic ſolution ſhould be employed once or twice daily, as a waſh.

It is almoſt unneceſſary to remark, that no light ſhould be admitted to the eyes, not merely while they continue inflamed, but as long as it excites pain: Even when one eye only is inflamed, care ſhould be taken to keep them both covered; for we know from obſervation, that the expoſure even of a ſound eye to light, while the other is inflamed, almoſt conſtantly proves hurtful to both.

The eyes, however, ſhould never be kept cloſely tied down: By keeping them too warm, much harm is often done. They ſhould be lightly covered with a looſe bandage either of ſilk or ſoft li-

nen; and when the patient is able to go abroad before his eyes can bear much light, the bandage in Plate XIII. fig. 1. may be uſed with advantage: By means of it, the quantity of light admitted to the eyes is eaſily regulated, whilſt the eyes themſelves are neither compreſſed nor kept too warm.

By due perſeverance in this kind of courſe, local inflammation of the eyes is in moſt inſtances removed; but where it proceeds from, or is connected with, ſcrofula or lues venerea, no remedy will prove ſucceſsful, till the diſeaſe of the ſyſtem is removed.

With a view to prevent thoſe frequent returns of ophthalmia to which many are liable, various remedies have been recommended, particularly aſtringent lotions. They ſeldom, however, anſwer any good purpoſe; and when too ſtrong, they are very apt to do harm. During the continuance of inflammation, we often derive advantage from bathing the eyes with weak ſolutions of ſugar of lead,

or

or white vitriol; but they have no effect in preventing a return of inflammation. For this purpoſe, nothing that I have ever employed proves ſo certainly uſeful as cold bathing. By keeping the head ſhaved, and immerſing it daily in cold water, much may be done in preventing thoſe frequent returns of inflamed eyes, to which many are liable. For the purpoſe of applying local bathing to the eyes, different means are employed; but the moſt ſimple and moſt effectual is by means of a cup, repreſented in Plate XLI. fig. 2. This cup, which ſhould be of an oval form, and ſomewhat larger than the eye, being filled with water, or any other liquid, and applied to the eye, if in this ſituation the eyelids are opened and moved about, the whole ſurface of the eye will be thus effectually bathed. As a preventative of ophthalmia, a liberal uſe of Jeſuits' bark has alſo proved uſeful; and we know from experience, that in periodical returns of the diſeaſe, it is almoſt the only remedy on which we have to de-

pend. I need ſcarcely obſerve, too, when any cauſe is diſcovered by which inflammation appears to be excited, or kept up, that it ought to be avoided; for if this precaution is neglected, no remedy will anſwer.

SEC-

SECTION III.

Of Wounds of the Eyelids and Eyeball.

AS the cure of wounds has already been treated of in Chapter II., it may be conſidered as out of place to enter upon any part of the ſubject again; but I judged it proper to reſerve for this place a more particular conſideration of wounds of the eyelids and eyeball.

In wounds of the eyelids, the parts may be divided either in a longitudinal or tranſverſe direction with reſpect to the courſe of their muſcular fibres. If the ſkin only is divided, or, if a wound penetrating the whole ſubſtance of the eyelid, is inflicted in ſuch a manner as merely to ſeparate the fibres of the orbicularis muſcle from one another, all that we have to do is to draw the ſkin and other divided parts exactly together, and to re-

tain them in this ſituation with ſlips of adheſive plaſter. As in ſuch circumſtances no retraction can take place of the divided parts, they are eaſily retained; and care ſhould be taken that they are kept in this ſituation till they unite.

But when the orbicularis muſcle is cut tranſverſely, eſpecially when a correſponding part of the tarſus or cartilaginous border of the eyelid is likewiſe cut, more care is requiſite. If they are allowed to ſeparate much, ſuch a want of tone in the eyelid is apt to take place, as ſerves to interrupt its uſual motions: And again, if the divided parts are drawn too tightly together, they impede the motion of the eyeball.

In tranſverſe wounds of the eyelids, it is ſometimes neceſſary to employ ſutures. The interrupted ſuture is uſually preferred; but the twiſted ſuture anſwers better. The method of performing theſe ſutures having been deſcribed in Chap. VI., I have at preſent only to remark, that in the practice of either of them upon the

the eyelids, much nicety and delicacy is required, otherwiſe much harm may be done, not only to the eyelids, but to the eye itſelf. When the twiſted ſuture is employed, the pins ſhould be ſhort and ſmall, ſo as to run as little riſk as poſſible of hurting the contiguous parts, and they ſhould be made to paſs not only through the ſkin, but into the fibres of the orbicularis muſcle, otherwiſe little advantage will be gained by the operation: But they ſhould not be carried entirely through the inner membrane of the eyelid. This would irritate and inflame the eye; and not being neceſſary, it ought to be avoided. If the ſkin is properly retained in its ſituation, with a few of the fibres of the muſcle underneath, a better cure will be obtained than if the needles were made to paſs through the whole ſubſtance of the eyelid; for in this manner the action of the muſcle is preſerved, whilſt no riſk is incurred of the eyelid being too much contracted; a circumſtance very apt to occur

occur when the whole thickneſs of the eyelid is penetrated by the ſutures.

It is almoſt unneceſſary to obſerve, that in order to inſure ſucceſs from this operation, the motion of both eyes ſhould be as much as poſſible prevented, otherwiſe no union of the divided parts will be obtained; the eye will be irritated; inflammation will occur; and this will render it neceſſary to remove the ſutures before they have effected the purpoſe for which they were employed.

On the ſutures being finiſhed, the eyelids ſhould be cloſed and covered with a pledget of lint or ſoft linen ſpread with ſaturnine cerate, that the parts may be kept as eaſy as poſſible; and a compreſs of lint being laid laid over it, and another over the ſound eye, the whole ſhould be retained by a napkin over the head, tied in ſuch a manner as to preſs equally and gently upon both eyes. Inflammation ſhould be ſtrictly guarded againſt; or if it has already taken place, we muſt endeavour to remove it by the means pointed out

out in the laſt ſection; and in the courſe of three days from the ſutures being inſerted, they ſhould all be removed; for in this period, if the parts have been kept in contact, their union will be complete.

We have hitherto been ſuppoſing, that the parts are only ſimply divided; and when replaced, that the eye is found to be as completely covered as before: But it ſometimes happens, that they are not only divided but deſtroyed; in which caſe, when ſuch a portion of the eyelids is removed, as to prevent the parts that remain from being brought into contact without impeding the motion of the eye, it will be more prudent to leave them at ſome diſtance from each other; and by treating them with light dreſſings, to truſt to nature for ſupplying the deficiency, by a new production of cellular ſubſtance.

The mechaniſm of the eyelids is peculiarly adapted for the protection of the parts beneath from too free an admiſſion of light, air, and duſt; but no poſſible ſtructure could prevent them from ſuffering

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ing by injuries of a different kind: We accordingly find, that the eyeball is liable, like other parts of the body, to wounds, contuſions, and other injuries.

As the bones at the bottom of the orbit are in ſome parts extremely thin, wounds of the eye which penetrate deep prove dangerous from the near contiguity of the brain: But ſuperficial wounds, that penetrate only the anterior part of the eye, although they may deſtroy the beauty and utility of the organ, are not in other reſpects to be conſidered as hazardous. Wounds of this part, however, of whatever kind they may be, require at all times the greateſt care and attention; not only with a view to the preſervation of ſight, but in order to prevent or obviate the effects of inflammation, a ſymptom which they very commonly induce.

Wounds of the tranſparent cornea, when directly oppoſite to the pupil, moſt frequently induce either a total or partial loſs of viſion; for the cicatric that ſucceeds very commonly remains opaque during life:

life: But although in this reſpect wounds of the anterior part of the eye are always to be dreaded, they ſeldom inflame ſo much as wounds of equal extent in the ſclerotica or opaque cornea, which are always more painful, and productive of more hazard.

In other parts of the body, a ſmall punctured wound is more to be dreaded than an extenſive cut; but in the eye, the riſk ariſing from wounds is moſt frequently in proportion to their extent; a circumſtance which with ſurgeons ought to have influence in the preference which they give to the different operations on the eyes: It is not the pain ariſing from theſe operations to which I allude, and which frequently occurs in a greater degree from punctures than from very extenſive cuts; but it is the riſk induced by large wounds, of diſcharging the humours or contents of the eye, by which viſion, if not entirely deſtroyed, ſeldom fails to be injured; by which the eye is often ſo much diminiſhed, as to ſink almoſt to the bottom of the orbit:

orbit: I ſhall, however, when treating of cataract, have occaſion to conſider this ſubject more fully.

In the treatment of wounds of the eye-ball, to prevent or remove inflammation ſhould be conſidered as our moſt important object. When a wound in the eye is large, it is ſcarcely poſſible to prevent the humours from being diſcharged; for the natural and uſual action of the muſcles neceſſarily forces them out. In this caſe, no benefit is derived from the ſkill of the practitioner, and the uſe of the eye is immediately loſt: But for one eye that is deſtroyed in this manner, twenty are ruined by inflammation, either from its being ſo violent that no remedy can leſſen or remove it, or from its being too eaſily treated at firſt, and allowed to proceed too far before the neceſſary remedies are employed: In every wound, therefore, of this organ, all thoſe means ſhould be immediately adviſed, which, by experience, we know to prove moſt effectual in the prevention of this

this ſymptom; but theſe having already been fully mentioned in Section II. of this Chapter, it is not neceſſary to enumerate them again.

In wounds of the eyeball, the ſtructure of the parts renders it impoſſible to diminiſh the extent of the opening: The parts in this ſituation cannot, as in the eyelids, be placed in contact, and retained with ſutures: Nothing of this kind being here admiſſible, all that art can attempt, is, together with a ſtrict antiphlogiſtic regimen, to keep the eye lightly covered with a pledget of any emollient ointment; to bathe it from time to time with a weak ſolution of lead; and when the pain becomes ſevere, to give adequate doſes of opium.

In extenſive wounds of the eye, attended with an entire diſcharge of its contents, permanent blindneſs, with the uſual deformity induced by the ſinking of the eyeball, muſt neceſſarily ſucceed; but in wounds of leſſer extent, we have it frequently

quently in our power, by due attention to the means that I have adviſed, to remove ſymptoms which otherwiſe might end in the greateſt danger.

SEC-

SECTION IV.

Of Tumors of the Eyelids.

SMALL tumors occaſionally form on the eyelids, which by impeding their motion, and rubbing on the globe of the eye, are apt to excite a great deal of diſtreſs.

The contents of theſe tumors are various, and of different degrees of firmneſs. Towards the internal angle of the eye, and moſt frequently on the under eyelid, near to the lachrymal punctum, ſmall tumors are apt to form, chiefly of the inflammatory kind, and in this country commonly termed the Stye *. They begin with a ſenſation of fulneſs, ſtiffneſs, and uneaſineſs in the internal canthus of the eye. At firſt the ſkin is ſcarcely diſcoloured; but if the tu-

* This is a variety of the Hordeolum of Sauvages and other noſologiſts.

mor proceeds to ſuppuration, it becomes firſt of a pale red, and afterwards yellow, when it commonly burſts and diſcharges a thick purulent matter. The ſtye is a tumor altogether inflammatory, and ſhould be conſidered indeed in no other light than a common boil or abſceſs. The only circumſtances in which it differs from boils in other parts of the body, are, the colour of the ſkin not being of ſuch a deep red at firſt, and its advancing more ſlowly to ſuppuration. This, however, proceeds evidently from the peculiarity of its ſituation; for the matter being ſeated between the tarſus and internal membrane of the eyelid, the firmneſs of the cartilage prevents the ſkin which covers it from being much diſcoloured.

Theſe are the tumors that prevail moſt frequently on the eyelids; but they are alſo liable to others, in common with other parts of the body.

The firſt of theſe that I ſhall mention is commonly of a round form, and ſomewhat ſoft or compreſſible: It ſeems to move or roll

roll when preſſed upon; the ſkin retains its natural appearance; and from the contents of it when laid open being of a fatty nature, we term it a Steatoma. The ſoft white matter, of which theſe tumors are compoſed, is always ſurrounded with a firm membranous cyſt.

Small tumors or excreſcences form occaſionally on different parts of the eyelids, in ſome inſtances, with narrow pendulous necks; in others, with thin broad baſes. Some, being of a ſoft fleſhy conſiſtence, are termed Sarcomatous tumors; whilſt others, being hard and firm, are denominated Verrucæ, or Warts.

In the treatment of the ſtye or ſmall boil, ſo frequently met with near the internal angle of the eye, ſome doubt has ariſen of the propriety of bringing them to ſuppuration; and by many it is even ſaid, that we ſhould in perhaps every inſtance, by means of vitriolic and other aſtringent applications, attempt to remove them by reſolution or diſcuſſion. Almoſt the only reaſon, however, that can be given for this

is, the trouble of bringing them to ſuppuration: But on conſidering the advantage to be derived from it, and the hazard of injuring the eyelids, by frequently attempting to repel what nature means to diſcharge, we will not heſitate in the choice of our method of cure. By bringing theſe tumors to ſuppuration, we incur indeed ſome additional trouble; but it is ſeldom conſiderable: And as ſoon as matter is fully formed, if it does not burſt and diſcharge itſelf, opening the tumor with the point of a lancet procures complete relief, and the ſore commonly heals quickly without further trouble.

As ſoon therefore as a ſtye is clearly formed, we ſhould endeavour, by a frequent renewal of warm emollient poultices, to bring the tumor to ſuppurate, and then to diſcharge the matter with a lancet, if it does not previouſly burſt of itſelf. I know from experience that the practice is perfectly ſafe; that the pain attending it is inconſiderable, and that it tends to prevent theſe tumors from ending in others

of

of a more inveterate kind, which, in the uſual method of treating them, is apt to happen. After this kind of boil has ſuppurated and diſcharged its contents, bathing the parts with a weak ſaturnine or vitriolic ſolution proves uſeful; in the proportion of a grain of ſaccharum ſaturni, or vitriolum album, to each ounce of water: It tends to remove any uneaſineſs that remains, and to reſtore the parts to their uſual tone.

All tumors of the eyelids of a firm conſiſtence, whether ſteatomatous or warty, as they cannot be made to ſuppurate, ſhould be removed by exciſion, as ſoon as they impede in any degree the motion of the eye. As long as they remain ſmall, they are for the moſt part inoffenſive, and are therefore overlooked; but whenever they begin to increaſe, they ſhould immediately be taken off.

In all warty excreſcences of a ſmall ſize, as well as in thoſe of the ſarcomatous kind, we are commonly adviſed to remove them with cauſtic; or if the baſe is ſmall, to do

it with a ligature. This, however, ſhould never be done: No reaſon indeed can be given for it but timidity either on the part of the patient or of the operator: Whether we employ cauſtic or ligatures, the cure muſt prove tedious; they commonly excite inflammation and irritability of the eye, and they frequently give more pain than is ever done by the ſcalpel: In the removal therefore of theſe tumors, we ſhould truſt ſolely to excifion, an operation neither attended with difficulty nor hazard.

The patient being ſeated oppoſite to a window, and his head ſecured by an aſſiſtant, if the tumor cannot be laid hold of with the fingers, a ligature ſhould either be paſſed round it, or puſhed through it with a needle, in order to enable the operator to raiſe it by pulling it gently from the parts beneath; and this being done, if its baſe is narrow, it may be removed at once; but when extenſively attached to the neighbouring parts, it is better by ſlow diſſection to enſure its total removal, than by proceeding quickly to incur the riſk

riſk of allowing part of it to remain, or to require further trouble afterwards in removing it. On the operation being finiſhed, a piece of ſoft lint ſhould be applied to the ſore, and retained with a ſlip of adheſive plaſter; by which the ſore very commonly heals eaſily, without further trouble.

When, again, the tumor is of the ſteatomatous or encyſted kind, inſtead of diſſecting it off covered with the ſkin that ſurrounds it, by which a troubleſome unſeemly cicatrix is always produced, it anſwers better merely to divide the ſkin by a ſimple inciſion with a ſmall ſcalpel. This ſhould be done from one end of the tumor along the moſt prominent part of it to the other; and a ſtrong waxed thread being paſſed through the centre of the cyſt, this ſhould be given to an aſſiſtant, in order to ſeparate or raiſe it from the parts beneath, while the ſurgeon himſelf, with cautious diſſection, endeavours to ſeparate the ſkin and cellular ſubſtance;

and this being done, the tumor is eaſily removed by the ligature.

When, in the courſe of the operation, it has become neceſſary to divide the internal membrane of the eyelid, no dreſſing ſhould be applied to the ſore, as the moſt inoffenſive we could employ would irritate and inflame the globe of the eye. All that, in ſuch circumſtances, ſhould be done, is, to lay the lips of the ſore as nearly together as poſſible; and to remove as frequently as is neceſſary, any ſuperfluous matter that may happen to form in it. But when it is found neceſſary to cut entirely through the eyelid, in order to render the cicatrix neat, the lips of the wound ſhould be drawn together with the fingers, and retained with ſlips of adheſive plaſter till they unite.

In the extirpation of theſe tumors, when the cyſt is firm, and the contents of the ſteatomatous kind, the bag ſhould be preſerved entire, as in this ſtate it is more eaſily and more effectually removed by doing ſo than in any other manner: But whenever

whenever the cyſt is thin, and eſpecially when the contents of it are fluid, it is commonly difficult, and in ſome inſtances impoſſible, to ſeparate the teguments from it beneath, without laying it open. In this caſe, after dividing the ſkin and cellular ſubſtance, by making an inciſion along the moſt prominent part of the tumor, it is better to open the cyſt at once by a large puncture with the point of a lancet, in order to diſcharge the matter contained in it, than to make any attempt, as is commonly done, to preſerve it entire; by which, in ſuch circumſtances, the operation is always rendered more tedious than it otherwiſe might be.

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SECTION V.

Of Inverſion of the Cilia, or Eyelaſhes *.

THE eyelaſhes are in ſome inſtances ſo much inverted, or turned inwards upon the eye, as to excite much pain, by rubbing or fretting the coats of it: In which caſe, it becomes neceſſary to remove them.

This inverſion of the cilia is produced by different cauſes: In ſome caſes, it proceeds from a derangement of the hairs themſelves, which leaving their uſual direction turn in towards the eyeball: But more frequently it is produced by a cauſe of a more diſtreſsful nature, an inverſion of the tarſus or cartilaginous border of the eyelid: This again is moſt commonly induced either by an unequal ſpaſmodic affection of the orbicularis muſcle of the under eyelid; for it is not frequently met with

* The Trichiaſis and Entropium of authors.

with in the upper palpebra: or it occurs as the effect of a cicatrix upon the ſkin of this part, the conſequence of ſome previous injury: In ſome inſtances, it is produced by tumors, forcing the eyelaſhes in upon the eye; and a relaxation of the external teguments of the eyelid has likewiſe been ſuppoſed to induce it. As the cauſe of the diſeaſe is various, ſo it is evident that the means of cure muſt likewiſe be ſo.

When it is found to originate ſolely from a derangement of the cilia themſelves, without any inverſion of the eyelids, we are directed by authors, in the firſt place, to pull out the inverted hairs with ſmall pliers; and to prevent them from growing again, we are deſired to burn their roots either with lunar cauſtic, or with the end of a red-hot wire. Nay, ſome have propoſed that the whole cartilaginous edge of the eyelid in which the hairs are placed, ſhould be entirely deſtroyed with cauſtic.

The

The pain and inflammation of the eye, induced by an inverſion of the cilia, is in ſome inſtances indeed ſo diſtreſsful, and it is ſo difficult to prevent them from rubbing upon the eye, that none who have ſeen how obſtinate they often are, will be ſurpriſed at the attention with which by many authors they have been conſidered: But it fortunately happens, that none of the painful remedies that I have mentioned are neceſſary; for the ſame intention may in almoſt every inſtance be accompliſhed by means of a more ſimple nature.

When the eyelaſhes have remained long in a deranged ſtate, and have acquired their full ſtrength and elaſticity, it is altogether impoſſible to bring them again into a proper direction. In ſuch circumſtances, therefore, they ſhould all be pulled out by the roots; for to cut them over, as is ſometimes done, tends only to make them ſtronger and ſharper than they were before. This being cautiouſly done with ſmall forceps or pliers, relief is thus commonly obtained immediately: But unleſs we

we can prevent the new hairs from taking a ſimilar direction, they very ſpeedily advance ſo far as to induce a return of the diſeaſe. Nothing, however, can be done for this, till the new hairs have acquired ſome length; but as ſoon as they are about half their uſual length, and whilſt they are yet more ſoft and pliable than they afterwards become, by turning them down upon the eyelid with the end of a blunt probe, and retaining them in this ſituation for two or three weeks, either by covering them with narrow ſlips of adheſive plaſter, or with ſtrong mucilage or glue by means of a ſmall pencil, a complete cure may thus be commonly obtained. Much attention is neceſſary, indeed, in order to enſure ſucceſs; more, it muſt be acknowledged, than the diſeaſe commonly meets with: But due perſeverance in the means I have mentioned, will in almoſt every inſtance anſwer; and being an eaſy method of obtaining relief in a very painful affection, nothing ſhould be omitted that can tend

to

to render the practice of it frequent and more certain.

When, again, the diſeaſe appears to originate from an unequal ſpaſmodic exertion of the orbicularis muſcle of the eyelid, no danger can enſue from making a ſlight inciſion on the internal ſurface of the under palpebra, of ſuch a depth as to divide thoſe fibres of the muſcle that appear to be contracted, and by which the inverſion of the cilia is produced. The only inconvenience that this can produce, is ſome degree of ſtiffneſs or immobility in the under eyelid, but which could not, even in the worſt degree of it, be of much importance: And as no other remedy could in this variety of the diſeaſe prove uſeful, we ſhould not heſitate to adviſe it. If, then, thoſe fibres of the muſcle that appear to be preternaturally contracted are freely divided, a cure of the diſeaſe will be obtained, and the inciſion will readily heal, without any dreſſings being applied. In this ſituation, indeed, no dreſſing can with propriety be employed; but experience ſhews that it is not

not neceſſary; for a cut in this part commonly heals eaſily.

When the cilia are found to be puſhed in upon the eye, either by a tumor or cicatrix of ſome old ſore, no cure can be obtained till the cauſe is removed. When produced by a tumor, this muſt be extirpated in the manner pointed out in the laſt ſection; and when an old citratix falls to be removed, we do it by making an inciſion with a ſcalpel ſo as to ſurround the whole of it, and afterwards in a ſlow cautious manner diſſect it off.—When the preſſure produced by the cicatrix has been the ſole cauſe of the cartilage being turned inwards, the removal of the cicatrix will in general remove the diſeaſe; and in this caſe the ſore may be healed in the uſual manner with eaſy dreſſings. But when it is found that the direction of the cilia is not immediately altered upon the cicatrix being removed, the lips of the ſore ſhould be drawn together, ſo as to bring the edges of the divided ſkin into contact; and in this ſtate they ſhould be

ſecured

ſecured either with ſlips of adheſive plaſter; or when this does not anſwer, it may be done either by the twiſted or interrupted ſutures: By which means the points of the eyelaſhes may be turned entirely outwards, ſo as to accompliſh in the moſt complete manner the intention of the operation.

It has alſo been ſuppoſed, as I have already remarked, that this diſeaſe may be produced by the external ſkin of the eyelid being too much relaxed. This, however, is what I never met with; and as we cannot ſuppoſe that theſe parts are retained in their ſituation by any exertion of the ſkin alone, it is not probable that any relaxation to which it is liable can have much influence in giving them a wrong direction; but if the contrary ſhould ever be the caſe, the remedy to be employed is obvious: If the diſeaſe is of ſhort duration, and the relaxation and loſs of tone in the ſkin not conſiderable, bathing the parts frequently with a ſtrong ſolution of alum in an infuſion of oak-

bark,

bark, or with any other aſtringent, may leſſen or remove it; but when this does not anſwer, our only reſource is to remove all the relaxed ſkin with a ſcalpel: This being done, we draw the edges of the cut together, and retain them till they unite, either with adheſive plaſters, or ſutures, in the manner already pointed out.

An inverſion of the cilia conſtantly excites, as I have already obſerved, inflammation of the eyeball: This ſymptom, however, commonly ſubſides on the hairs being removed; but when this does not happen, thoſe means muſt be employed which uſually anſwer beſt for the removal of inflammation of the eyes, by whatever cauſe it may be induced. Theſe having been enumerated in Section II. of this Chapter, it is not neceſſary to ſpeak of them here.

I have already obſerved, that the inverſion of the cilia occurs moſt frequently in the under eyelid. In ſome inſtances, however, we meet with it in the upper pal-

pebræ; and in ſuch caſes it is ſcarcely neceſſary to remark, that the diſeaſe being exactly ſimilar both in its cauſes and effects, the means employed for removing it ſhould be the ſame. In the upper eyelid, a ſwelling occaſionally occurs over the whole of it, by which the uſual and natural exertion of its muſcles is either much impeded, or perhaps entirely interrupted, and by which, too, the eyelaſhes may be ſo far inverted, as to produce this diſeaſe. In ſuch caſes, as the ſwelling of the eyelid is commonly of the dropſical kind, it is more readily removed by two or three ſmall punctures with the point of a lancet than by any other means: But when this does not prove ſufficient, if it appears to be perfectly local, and not connected with an anaſarcous ſwelling over the reſt of the body, rather than allow viſion to be much interrupted by a continuance of the ſwelling, it has been propoſed to cut out a ſegment of the moſt prominent part of the ſkin, to diſcharge any water that may be contained in it,

and

and to reunite the divided edges of the ſore with ſutures. Nay, much time and ingenuity has been employed in the invention of inſtruments for effecting this operation neatly, and without much loſs of blood; an occurrence, which in former times was always much dreaded. This ſhould indeed be guarded againſt as far as is neceſſary; but in the operation of which we are ſpeaking, it can never require much attention, for none of the blood-veſſels in thoſe parts are of a ſize that can render it dangerous to divide them.

The inſtrument to which I allude acted ſolely by preſſure: All the ſkin meant to be removed being included between two thin plates of braſs or ſteel, a degree of preſſure ſufficient to deſtroy the circulation in the contained parts was applied and continued by means of a ſcrew till the whole dropped off; but as the operation may be both more neatly and more ſpeedily done with a ſcalpel, it ought in every inſtance to be preferred. In what-

ever way it is done, as much of the ſkin ſhould be removed as appears to be ſuperfluous. If the edges of the ſore, on being brought together, can be retained with adheſive plaſter, it ought to be done; but when plaſters do not anſwer, we have recourſe to the interrupted ſuture.

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SECTION VI.

Of the Gaping or turning Outwards of the Eyelids.

THIS deformity is produced by the internal ſurface of one or both of the eyelids being turned outwards ſo as to fold over ſome part of the cilia and contiguous ſkin: By noſologiſts it is in general termed Ectropium; and Lagophthalmus when in the upper eyelid only, from the reſemblance which it is ſuppoſed to bear to the eye of a hare.

Every degree of this affection occaſions deformity; ſo that even in this view it merits attention: But in its more advanced ſtages it frequently gives much diſtreſs, by leaving a conſiderable part of the eye uncovered.

The internal membrane of the eyelids may be turned outwards by various cauſes:

Tumors of whatever nature they may be when ſeated within the orbit, ſometimes produce it: It is alſo induced by dropſical effuſions in the cellular ſubſtance that covers it; and likewiſe by inflammation of the ſame part. Relaxation, induced either by an inflamed ſtate of this part, by a previous dropſical ſwelling, or merely as a conſequence of old age, excites the moſt obſtinate kind of it: And laſtly, we find it often induced by the cicatrix of a wound or abſceſs, when ſo ſituated as to corrugate or contract the ſkin of either of the eyelids. In the method of cure it is evident, that due attention becomes neceſſary to the particular cauſe by which it is produced.

When tumors are diſcovered to be the cauſe, they muſt be removed in the manner pointed out in Section IV. of this Chapter. When they appear to be dropſical, connected with general anaſarca, if the diſeaſe of the ſyſtem is carried off, this particular ſymptom will moſt frequently vaniſh alſo; but when it appears

to

to be local, as in ſome inſtances is the caſe, no dependence is to be placed on medicines: In this caſe, the effuſed fluid ſhould be diſcharged either by punctures or ſcarifications, not made through the external coverings of the eyelids, but directly into that part of the internal membrane that is protruded by the water collected within it. Small punctures ſhould be firſt adviſed with the point of a lancet; and if theſe fail, ſcarifications ſhould be made with one or other of the inſtruments delineated in Plate XII. fig. 4. or in Plate XXIII. fig. 5. all along the courſe of the ſwelling; and being carried to a ſufficient depth, they will not only diſcharge the effuſed water, but the inflammation which they excite will tend to prevent it from collecting again: After the water is diſcharged, and any inflammation induced by the operation is gone, the parts ſhould be frequently bathed with a weak ſolution of white vitriol, or any other aſtringent collyrium.

In caſes of ectropium induced by inflammation, our means of cure ſhould be chiefly directed to the removal of this ſymptom; and, for the moſt part, when not long neglected, or not particularly obſtinate, the protruſion will ſubſide on the inflammation being removed. But when the inflammation has ſubſiſted long, the protruſion often continues fixed and permanent long after the cauſe that gave riſe to it is gone: Whenever the diſeaſe therefore depends upon this cauſe, we ſhould endeavour by the moſt active remedies to have it ſpeedily carried off. In Section II. of this Chapter, theſe have been fully enumerated: I have now therefore only to remark, in addition to the means that were there pointed out, that deep ſcarifications into the inflamed membrane itſelf prove here particularly uſeful. The veſſels of the protruded membrane are in this ſtate of the diſeaſe commonly ſo turgid as to give it a conſiderable degree of preternatural thickneſs: If this increaſe of bulk be not removed, no cure

can

can take place; and nothing tends with ſuch certainty to accompliſh this, as unloading the inflamed veſſels of their contents; which we do in the moſt effectual manner by deep ſcarifications.

When, again, the diſeaſe occurs from relaxation, as is often the caſe in advanced ſtages of life, no chirurgical operation ſhould be adviſed. In this ſituation we truſt altogether to palliatives. The patient ſhould be deſired to bathe his eyes daily in cold water, or in water mixed with a ſmall proportion of brandy; or, he may uſe a weak aſtringent collyrium of vitriolum album and ſaccharum ſaturni diſſolved in water. In this manner, he may prevent the diſeaſe from advancing farther, and in ſome inſtances may even be able to remove it. But whether this ſhould be the caſe or not, when it is evidently the effect of old age, nothing very ſevere in its operation ſhould ever be adviſed.

The moſt diſtreſsful, and perhaps the moſt frequent cauſe of ectropium, is the cicatrices

cicatrices of ſores, abſceſſes, and the confluent ſmall pox, when ſo ſituated as to contract the ſkin of either of the eyelids. A cicatrix may be ſo ſituated, as we have ſeen in the laſt ſection, as to produce an inverſion of the cilia. Of this I have met with different inſtances, but it more frequently happens, that the diſeaſe we are now conſidering is induced by it.

As the diſeaſe is here evidently induced by a preternatural contraction of the ſkin connected with the eyelid, nothing can accompliſh a cure but the diviſion of ſuch parts of the ſkin as are thus morbidly drawn together. For this purpoſe, the operator, by an attentive examination of the parts affected, ſhould render himſelf perfectly certain of the full extent of the diſeaſe; and this being done, an inciſion ſhould be made directly acroſs that part of the ſkin which appears to be contracted, and carried freely into the cellular ſubſtance by which the ſkin is connected to the parts beneath. When the contraction

contraction takes places at one point only, a free diviſion of the ſkin at this part will be ſufficient; but it commonly happens, that the ſkin is fixed to the parts beneath over the whole courſe of the cicatrix; in which event, a ſmall inciſion, in the manner I have mentioned, and with which operators in general reſt ſatisfied, will have little or no effect in removing the diſeaſe.

In this caſe, after making an inciſion through the teguments from one end of the cicatrix to the other, the edge of the divided ſkin ſhould be raiſed with the aſſiſtance of diſſecting forceps, and the whole of it ſhould be ſeparated and removed with the ſcalpel from the parts to which it adheres. If this is properly done, that part of the eyelid that was turned outwards, will either return of itſelf to its natural ſituation, or it may be eaſily replaced by the operator; and this being done, the reſt of the cure muſt conſiſt in ſuch an application of a bandage, or of ſlips of adheſive plaſter, as will retain

tain the ſkin, till by the formation of granulations at the bottom of the ſore, any farther contraction may be prevented. To give directions for the application of bandages is unneceſſary, as it muſt always depend on the ingenuity of the operator. In general, however, I may remark, that when ſlips of adheſive plaſter can be made to anſwer the purpoſe of bandages, they ought to be preferred for parts contiguous to the eyes, where bandages can never be applied with ſuch tightneſs as to retain the dreſſings, without injuring the parts beneath.

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SECTION VII.

Of Concretion of the Eyelids.

IT has long been known, that any two parts of an animal body being kept in contact when inflamed, very readily unite together; a fact that accounts for many phenomena, and among others for thoſe adheſions of the eyelids that ſometimes ſucceed to an inflamed ſtate of theſe parts. Inflammation of the eyelids, when of long duration, frequently forms partial adheſions, not only of the eyelids to each other, but to different parts of the eye itſelf: To ſlight degrees of this, a patient will commonly rather ſubmit, than undergo the pain and terror of an operation; but when the adheſions are ſo conſiderable as to impede the motion of the eyelids, and thus to obſtruct viſion, it becomes neceſſary to employ the moſt effectual means for

for relief. It ſometimes happens, too, that the eyelids adhere together at birth, of which I have met with different inſtances.

When the adheſion is ſlight, and not of long duration, it may in general be removed by ſeparating thoſe parts of the eyelids that adhere, with the end of a blunt probe paſſed behind them; but when they adhere either firmly to each other, or to the eyeball, a cure can be effected by diſſection only. In performing this operation, the patient's head ſhould be firmly ſecured by an aſſiſtant, who ſhould likewiſe endeavour to ſupport or elevate the upper eyelid, whilſt the ſurgeon, with ſmall forceps in one hand, ſhould raiſe or ſeparate the under palpebra, and at the ſame time ſhould proceed to divide with a ſcalpel in the other, every fibre by which the adheſion is produced. In every part of the operation, much ſteadineſs is required; particularly where any part of the palpebræ adheres to the eyeball.

When

When the cauſe of adheſion is thus completely removed, as the dreſſings uſually applied to ſores cannot with propriety be uſed here, all that we ſhould attempt, is to cover the eye with ſoft lint ſpread with Goulard's cerate, or any other emollient ointment; and after the firſt dreſſing, a ſmall portion of the ſame ointment, perhaps the ſize of a pea, may be daily inſinuated between the eyelids: By this means the ſore is kept ſoft and eaſy, at the ſame time that the uſual motion of the eyelids prevents every riſk of new adheſions between the parts newly divided. In this, however, as well as in every operation upon the eye, the ſtructure of which is ſo delicate as to render it very ſuſceptible of inflammation, much attention is neceſſary to prevent this ſymptom, and to remove it when it has actually taken place.

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SECTION VIII.

Of Fleſhy Excreſcences on the Cornea.

EYES that have been liable to repeated attacks of inflammation, are apt to have a membranous ſubſtance form on ſome part of the opaque cornea: This, in ſome inſtances, continues of a ſmall ſize, and does not produce much inconvenience, while in others it extends ſo as to form a ring round the whole tunica conjunctiva, and even ſpreads to ſuch an extent as to cover not only all the opaque cornea, but even the tranſparent part of the eye.

Being ſuppoſed to reſemble a fowl's wing, it has by ſome been termed Pterygium, and by others Onyx, from its reſemblance to the nail of a finger: It begins moſt frequently near the internal angle of the eye; but in ſome we firſt perceive

ceive it on the moſt prominent part of the tunica albuginea.

In ſome inſtances of ſevere inflammation, a tough yellow-coloured membranous ſubſtance forms and ſpreads over the whole eyeball: This, however, is perfectly inorganic, and is evidently of the ſame nature with thoſe cruſts or exſudations ſo frequently met with in parts recently inflamed: But the diſeaſe we are now conſidering conſiſts of an organic membranous ſubſtance, that is equally irritable with other parts of the body, and which, when wounded, diſcharges blood freely. It is indeed ſo clearly vaſcular, as to render it probable that it conſiſts entirely of a congeries of ſmall blood-veſſels, which being once forced out from any point of the ball of the eye, either as a conſequence of external violence or of inflammation from any other cauſe, we can eaſily ſuppoſe that every freſh attack of inflammation will cauſe them pullulate or ſhoot out in a degree ſomewhat

proportioned to the violence of the cauſe by which it is produced.

In ſome inſtances, this production does not appear till the violence of the inflammation is over: In which caſe, it is not accompanied with pain, unleſs when ſome cauſe of irritation is applied to it; but in others it takes place during the continuance of inflammation, when the pain attending it is always ſevere. During this inflammatory ſtate of the diſeaſe, this membrane is in general of a deep red colour; but when the inflammation ſubſides, it becomes pale and ſomewhat yellow.

As long as this kind of excreſcence continues of a moderate ſize, and does not impede the motion of the eyelids, nor obſtruct viſion, all we ought to do is, by means of gentle aſtringents, to endeavour to prevent its increaſe. In ſection II. of this chapter, I have ſaid all that appears to be neceſſary on the ſubject of inflammation. I ſhall now therefore ſuppoſe that the inflammatory ſymptoms are,

by the means which were then pointed out, either removed or much mitigated, and that our attention is now to be directed to the removal of this preternatural membranous production. In this ſtate of the diſeaſe, aſtringent applications, as I have obſerved above, ought to be alone depended on as long as the ſize of the excreſcence is inconſiderable. A weak ſolution of corroſive ſublimate, in the proportion of a grain to four ounces of water, has ſometimes proved uſeful; but in general, nothing anſwers either with ſuch certainty or ſafety as white vitriol, or alum, diſſolved in water, care being taken to have the ſolution of ſuch a ſtrength as the eye can eaſily bear. A ſcruple of white vitriol, or half a drachm of alum, to four ounces of water, will in general prove ſufficiently ſtrong: but in every caſe, the ſtrength of the remedy ought to depend on the feelings of the patient; for with ſome it may be employed of double the ſtrength which others can bear.

A proper uſe of eſcharotic powders has alſo proved uſeful here; but in this form, eſcharotics require to be uſed with much caution. Calcined alum in fine powder, a ſmall proportion of white vitriol, or of verdegris, mixed with a ſufficient quantity of white ſugar, or any other powder of a mild nature, may all be uſed for this purpoſe. A ſmall quantity of any of theſe may be ſprinkled upon the diſeaſed part once or twice daily, and repeated as long as any benefit is derived from them; or the uſe of the powders may be alternated with that of the waſh in the manner I have mentioned.

A due perſeverance in the uſe of theſe remedies will very commonly retard, as I have obſerved above, the progreſs of the excreſcence; but when it proves otherwiſe, and when it proceeds ſo far as to cover any part of the tranſpareut cornea, as this might ſoon be attended with a total loſs of ſight, other means ſhould be employed.

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As our object here is to remove the excreſcence entirely, the ſcalpel alone is to be truſted. Authors, who have written on this ſubject, deſcribe an operation for the purpoſe of removing membranes of this kind by diſſection. When the excreſcence is looſe through a conſiderable part of its extent, and attached to the eye by a ſmall pedicle only, it may be removed with ſafety and expedition with a ſcalpel; and in ſuch caſes, this method ſhould be preferred to every other. But whenever it adheres to the eye over its whole ſurface, to remove it by diſſection is both difficult and hazardous; and as the ſame intention may be carried into effect by more gentle means, theſe ought to be adopted.

This excreſcence is very commonly ſeated, as I have already obſerved, upon ſome part of the tunica conjunctiva, and approaches in a gradual manner towards the centre of the eye: We have likewiſe ſeen that it conſiſts almoſt entirely of an extenſion or elongation of a number of ſmall bloodveſſels: Hence we may con-

clude, that nothing will tend with more certainty to remove it, than the deſtruction or diviſion of thoſe veſſels by which it is produced: And accordingly I have in various inſtances been able to complete the cure of ſuch affections by theſe means alone; and as the operation for this purpoſe, with thoſe accuſtomed to perform it, is neither attended with difficulty nor danger, it ought always to be done as ſoon as the diſeaſe is found to reſiſt the means uſually employed for it.

The method of performing it is this: The patient being placed upon a pillow on the floor, the ſurgeon, ſitting behind on a chair, ſhould cauſe him incline his head backwards upon his knees, with his face raiſed in ſuch a manner that a ſufficient degree of light may fall directly upon his eyes. This being done, and the patient's hands properly ſecured, the under eyelid ſhould be drawn down by an aſſiſtant, while the upper palpebra is ſupported in ſuch a manner by the left hand of the ſurgeon, as to expoſe to view the full extent

of

of the diſeaſe on the eyeball. With the knife, fig. 4. Plate XII., he is now to make ſcarifications through the full thickneſs of the excreſcence, near to, and entirely round, its external circumference, ſo as to cut off all communication between the roots and extremities of thoſe veſſels of which it is formed. This may either be done by one continued ſtroke of the ſcalpel, or with repeated ſmaller ſcarifications; and in order to render the ſucceſs of the operation more certain, by a free diviſion being made of every bloodveſſel connected with the excreſcence, after the diſcharge of blood induced by the firſt inciſions is abated, one, two, or more circular ſcarifications may be made within one another, in ſuch a manner as that the laſt may be contiguous to the centre of the excreſcence.

In making theſe ſcarifications, it is neceſſary to avoid the eyeball; for which reaſon, it is better to do the inciſions by repeated ſtrokes, than to go to the full depth of the excreſcence at once; but it

may be done with much more eaſe in the manner I have mentioned, than by lifting the excreſcence with a needle and ligature before dividing it; for we may juſt as readily injure the coats of the eye with the needle as with a ſcalpel. This method of elevating the parts to be divided by means of a ligature, is much recommended by ſome practitioners; but I know from experience, that the operation may be performed with more eaſe in the manner I have pointed out.

After as many inciſions have been made as appear to be neceſſary, the parts may be allowed to bleed freely, and may be afterwards bathed two or three times daily with a weak ſolution of ſaccharum ſaturni. The inciſions may alſo be repeated in a ſimilar manner, if, in the courſe of a few days, the excreſcence does not begin to diminiſh; and the ſame operation may be renewed with ſafety from time to time, as long as any part of the diſeaſe is found to remain.

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When, again, any portion of the excreſcence is obſerved to become more looſe in its connection with the eye, either in conſequence of the number of inciſions made in it, or of the ſuppuration which commonly enſues from this operation, it ought immediately to be removed with the ſcalpel: but when this does not happen, and when every part of it continues ſtill to adhere firmly to the eye, no attempt ſhould be made to remove it.

When a cure can be effected by any means hitherto known, the plan that I have mentioned will more readily anſwer than any other; and being attended with no hazard to the eye, it ought to be preferred. But it is neceſſary to remark, that although this operation very commonly ſucceeds, yet inſtances ſometimes occur, in which no advantage is derived from it, and in which ſcarifications made in the excreſcence, or any other operation performed on it, inſtead of proving uſeful, is regularly attended with an increaſe of the diſeaſe. This being the caſe, the operation I have

have deſcribed ſhould not be perſiſted in. In ſuch circumſtances, a palliative courſe ought alone to be kept in view. No remedy with which we are acquainted, will in this ſtate remove the diſeaſe, but it may commonly be prevented from acquiring any additional increaſe; and the ſymptoms induced by it may be kept moderate, by the eye being frequently bathed with a weak ſaturnine ſolution, and by keeping it covered with pledgets of Goulard's cerate, or any other ſimilar application.

When it is found, however, that the diſeaſe does not yield to any of the remedies I have mentioned, and if the excreſcence ſtill proceeds to acquire an additional bulk; ſo as entirely to deſtroy viſion, and to excite ſevere pain, as this will give much cauſe to ſuſpect that it may degenerate into cancer, it ought at once to be removed by extirpating the eyeball. The remedy is no doubt ſevere: But in circumſtances ſuch as we are deſcribing, as the uſe of the eye is ſuppoſed to be irrecoverably

coverably loſt; and as the patient's life might be endangered by the contiguous ſound parts being allowed to remain long in contact with thoſe that are diſeaſed; no doubt ſhould be entertained of the propriety of removing them. The method of performing this operation will be the ſubject of one of the following ſections.

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SECTION IX.

Of Abſceſſes in the Globe of the Eye.

INFLAMMATION of the eyes is by experience known to terminate moſt frequently by reſolution; that is, the pain and tenſion abate, and the redneſs and fulneſs of the veſſels are diſcuſſed, without any marks being left of their having ever exiſted. Inſtances, however, occur of inflammation of the eye ending in the formation of matter; in ſome caſes, from thoſe means being omitted at firſt which moſt certainly tend to remove inflammation; and in others, from the patient being of a ſcrofulous habit or otherwiſe diſeaſed.

When the internal ſurface of the coat of the eye has been long inflamed, it ſometimes yields a purulent-like matter, which being poured into one or other of the chambers of the eye, is ſoon diffuſed over all

all the aqueous humour; by which the ball of the eye not only becomes enlarged, but viſion is either in a great meaſure or perhaps entirely deſtroyed; the appearance of the eye is much changed; and neither the iris, pupil or cryſtalline, can be diſtinguiſhed.

In ſome inſtances again, the iris is puſhed forward, and is obſerved to lie in cloſe contact with the internal ſurface of the tranſparent cornea: The coats of the eye being weaker here than in other parts, a protruſion commonly takes place, which, if not ſoon opened, at laſt burſts of itſelf, and diſcharges either ſome part or perhaps the whole contents of the eye; and at this opening, the iris, in a thickened diſeaſed ſtate, is very generally puſhed out. It is this diſeaſe which, from its ſuppoſed reſemblance to a grape, is denominated Staphyloma; different varieties of which are deſcribed by authors under different names: but, as theſe are all of a ſimilar nature, and require the ſame method of treatment, any difference of form from

whence theſe denominations have been taken, is not of ſuch importance as to deſerve notice; and as the diſtinctions they hold forth, anſwer no good purpoſe, I do not mean to enumerate them.

Under the general term of Staphyloma, a word I ſhall retain merely from its having been long employed, may be comprehended all collections, ſuch as I have deſcribed, that take place within the cavity of the eye. In moſt inſtances, as I have already obſerved, the tranſparent cornea is protruded from its being the weakeſt part of the eye; but in others, partial ſwellings or protruſions occur in the ſclerotica, or opaque cornea.

During the formation of this diſeaſe, the patient ſuffers not only loſs of ſight, but ſevere pains in the eye, that ſhoot backwards through the head, attended with want of reſt, heat, and other ſymptoms of fever; and theſe very commonly remain either till the eye burſts of itſelf, or till its contents are diſcharged by an opening made for the purpoſe.

In

In moſt inſtances, the pain is ſevere, but I have met with caſes in which no other inconvenience was experienced but deformity and loſs of ſight: But in theſe, any matter that forms in the ſwelling is in ſmall quantity, and the principal part of the tumor appears to be produced by ſerum; and in ſome inſtances perhaps by an increaſed ſecretion of the aqueous humour of the eye; but, whether it contains a greater or ſmaller proportion of pus, the external appearances are the ſame, and the method of treatment is likewiſe ſimilar.

Beſides the collections I have deſcribed, in which the matter is lodged within the coats of the eye, this organ, we find, is liable to abſceſſes of a different nature, in which the matter is ſeated in the ſubſtance of one or other of its tunics. In the ſmall-pox, it ſometimes happens, that a puſtule is ſeated on the eyeball, when the variolous matter being formed between two of its coats, gives all the appearances of a ſmall abſceſs: but collections of pus

alſo

alſo occur here from external injuries; and from inflammation, by whatever cauſe it may be induced; although by no means ſo frequently, as I have already remarked, as in other parts of the body.

This diſeaſe has, in general, been termed Hypopion. It ought not, however, to be diſtinguiſhed by any particular appellation; for, it is preciſely an abſceſs in the coats of the eye, and exhibits exactly the ſame appearances here, and requires to be treated in the ſame manner, as collections of matter in any other part.

The matter in this diſeaſe is met with in various parts of the eye; in ſome inſtances in the ſclerotica; but moſt frequently in the tranſparent cornea, when it very commonly deſtroys viſion entirely.

The hypopion is diſtinguiſhed from the ſtaphyloma by the matter being collected in a particular bag or cyſt; at leaſt it is always confined to one part of the eye, which is obſerved to be elevated

ted into the form of an ordinary abſceſs, whilſt the reſt of the eye retains its uſual form: But in the other, although the matter always at laſt forces out ſome protuberance; moſt frequently, as I have already obſerved, in the tranſparent cornea; yet an enlargement may be commonly obſerved over the whole ſubſtance of the eyeball: In both, the motion of the eyelids is much impeded; but, in the ſtaphyloma, this is always more conſiderable and more diſtreſsful than in the other, and in it alſo a ſenſe of tightneſs is felt over the whole globe of the eye; whereas, in the hypopion, this uneaſineſs occurs at a particular point only. In the latter, the pain is ſeldom ſo ſevere as when the matter is collected within the ball of the eye. Any uneaſineſs produced by it, affects the ſurface of the eye only, and does not ſpread back towards the head as it commonly does in the ſtaphyloma.

In the treatment of the ſtaphyloma, as it rarely happens that the uſe of the eye can be preſerved, our great object ſhould

be to abate the violence of the pain, and remove that deformity which an enlargement of the eye is always ſure to produce. With a view to abate the pain, blood-letting, bliſters, cooling applications to the eye, and opiates, are to be chiefly depended on at firſt: In this ſtage of the diſeaſe, indeed, the pain is to be conſidered entirely as the effect of inflammation, and to be accordingly treated in the manner I have pointed out in Section II. of this Chapter.

But when theſe and the other means employed for abating inflammation do not ſucceed; if ſuppuration takes place; and if the pain ſtill continues ſevere, as this very commonly occurs from the coats of the eye being diſtended; nothing will ſo certainly give relief, as diſcharging the matter by making an inciſion into the ball of the eye. This will commonly indeed evacuate all the humours of the eye, particularly the aqueous humour; but in circumſtances ſuch as we are deſcribing, this is not to be regarded, as viſion is already totally

tally deſtroyed by the diſeaſe. We are therefore to uſe the moſt effectual means for removing pain, and for obviating the deformity induced by the enlargement of the eye, without any regard to the humours which it contains. For this purpoſe, an opening ſhould be made in the eye ſufficiently large for diſcharging all the thinner part of its contents, the beſt ſituation for which is the moſt depending part of the tumor. The patient's head being ſecured by an aſſiſtant, and the operator ſtanding before him, the eyelids may be ſufficiently ſeparated with the fingers of one hand, while the point of the knife, fig. 4. Plate XII., being introduced with the other into the part to be opened, it may be eaſily carried forward in a horizontal direction, till an opening is made of a ſize ſufficient for the purpoſe.

Authors who have written upon this ſubject, inſtead of a ſimple inciſion into the tumor, direct all the prominent part of the eye to be cut off either with a ſcalpel or ſciſſars: Whilſt others, from an appre-

henſion of hemorrhagies from an extenſive wound, have adviſed the tumor to be removed with a ligature; by which they imagine that the eye may be ſufficiently diminiſhed, at the ſame time that the deformity produced by the ſwelling will be effectually removed. There is no neceſſity, however, for our adopting either of theſe methods; which are both of them more painful, and neither of them in any reſpect more uſeful than the mode I have adviſed, of diſcharging the contents of the tumor by a ſimple inciſion. The diſeaſe, as I have already obſerved, is in reality an abſceſs, or a collection of matter within the coats of the eyes; and ought to be treated exactly in a ſimilar manner with abſceſſes in other parts of the body; not by removing any part of the tumor, but merely by laying it open. There is indeed a variety of the ſtaphyloma ſometimes met with, in which, either from a long continuance of the diſeaſe, or from ſome cauſe with which we are not acquainted, the different humours of the eye

are

are totally abſorbed, or as it were annihilated, and in which all the external appearances of the diſeaſe that have juſt been deſcribed, are diſtinctly obſerved; but in which the tumor is formed by a thickening of the different coats of the eye, and particularly of the iris. In this ſituation, no benefit could enſue from this operation; nor from any other means, but the extirpation of all the prominent part of the eye; which is beſt done with a ſcalpel. It rarely happens, however, except in the very advanced ſtages of the diſeaſe, that this variety of ſtaphyloma is met with.

After the contents of the eye have been diſcharged, the parts ſhould be ſlightly covered with a ſoft compreſs, moiſtened with a weak ſaturnine ſolution; the patient ſhould be kept upon low diet; and every part of an antiphlogiſtic regimen ſhould be purſued, either till the wound in the eye is completely cured, or till there appears to be no riſk of inflammation.

With reſpect to the cure of hypopion, namely, that ſpecies of the diſeaſe in which matter is collected either in the ſubſtance of one of the coats, or between two of the coats of the eye, it ſhould be nearly the ſame with what I have adviſed for ſtaphyloma. In general, the pain is moderate, or is eaſily kept ſo with ſmall doſes of opiates; and as ſoon as the matter is freely and clearly formed, it ſhould be diſcharged by an inciſion made in the manner I have mentioned, in the moſt depending part of the abſceſs.

The general practice on this point ought not however to be followed. We commonly obſerve that practitioners decline to operate, till they are in ſome meaſure forced to it, either by the deformity being conſiderable, or by the abſceſs becoming ſo large as to impede the motion of the eyelids.—But delays ſhould be always avoided when it is obvious that ſuppuration has taken place; for as the matter of the abſceſs may juſt as readily burſt inwardly, and mix with the humours of the eye,

eye, as outwardly by an external opening; and as this very conſtantly terminates in a total loſs of viſion, it ought in every inſtance to be guarded againſt, by diſcharging the matter as ſoon as it is certain that ſuppuration has taken place.—The after-treatment of the parts ſhould be the ſame here as in caſes of ſtaphyloma.

In both theſe diſeaſes, fungous excreſcences are apt to form where the opening has been made; but this we may commonly prevent or remove by the application of calcined alum in fine powder, or touching the parts from time to time with lunar cauſtic, a practice from which I have never known any hazard enſue.

SECTION X.

Of dropſical Swellings of the Eyeball.

IN dropſical ſwellings of the eye, the patient complains of a ſenſe of fulneſs in the eyeball, long before any increaſe is perceived in it by others: At laſt the motion of the eyelids begins to be impeded; and although the power of viſion ſtill in ſome degree continues, yet it gradually becomes more imperfect, till at laſt the patient can ſcarcely diſtinguiſh light from darkneſs. In this period of the diſeaſe, ſome part of the eye, moſt frequently the tranſparent cornea, generally begins to protrude, ſo as to form a ſmall tumor, and if the contents of the eye are not now diſcharged by an operation, the ſwelling in this ſtate commonly proceeds to increaſe quickly, and ſoon burſts of itſelf.

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When the diſeaſe has been of long duration, it is apt to be miſtaken for ſtaphyloma, to which indeed it bears a reſemblance; but, in the real dropſical ſwelling, the patient is always ſenſible to the effects of light; and if the pupil can be diſtinguiſhed, a clear light will commonly make it contract. Whereas, in the other, excepting in its very firſt ſtages, the patient is never ſenſible to light, nor can any kind of contraction be diſcovered in the pupil. When theſe diſeaſes, however, are far advanced, our being able to diſtinguiſh them could be of little importance, as in this ſituation the uſe of the eye is in general ſo much deſtroyed as not to be recoverable: But in the commencement of this affection, we may very commonly diſtinguiſh it from the other; and when we are able to do ſo, it ought not to be neglected.

Staphyloma is evidently an inflammatory diſeaſe: It begins with all the ſymptoms of inflammation, and terminates in the formation of pus. By this circumſtance alone it is very diſtinctly marked;

ſo that, in the early period of the diſeaſe, it is eaſily diſtinguiſhed from a mere dropſy of the eye; in which no ſymptoms of inflammation take place, and in which the only marks of diſeaſe at firſt are, a ſenſation of fulneſs in the eye, which by degrees terminates in an enlargement of the eyeball, and in a confuſed ſtate of viſion.

When, by a long continuance of the diſeaſe, viſion is deſtroyed, all that we have in our power to do, is to remove the deformity ariſing from the enlargement of the eyeball; which is moſt effectually done by an inciſion made in the moſt prominent part of the tumor, in the manner that I have mentioned in the laſt ſection. But in the earlier ſtages of this tumor, an object of greater importance preſents itſelf, I mean the poſſibility of ſaving the uſe of the eye; which, from the reſult of ſome caſes that I have met with, there is reaſon, I think, to imagine might in many inſtances be done.

When water or any other fluid collects in the eye in ſuch quantities as to enlarge it

it much beyond its natural ſize, viſion is thus frequently deſtroyed merely by diſtention, when no other morbid affection is perceived. In ſuch circumſtances, when the nature of the diſeaſe is obvious, and as ſoon as the eye begins to loſe its uſual powers, inſtead of allowing the ſwelling to increaſe, as is commonly done, till it arrives at a great bulk, and till the power of viſion is loſt; would it not be better to diſcharge the fluid by which the ſwelling is produced? No danger could reſult from it, for the operation may be done with ſafety; and it would at leaſt prevent the eye from ſuffering by over-diſtention, and might thus give ſome chance of a cure being obtained, either as an effort of nature, or by the application of proper remedies.

The eaſieſt and beſt method of performing this operation, is by making a ſmall opening in the under and moſt depending part of the tranſparent cornea. By paſſing the point of the knife, fig. 4. Plate XII., into this part of the cornea,

and making an inciſion of three-tenths of an inch or thereby in length, all the aqueous humour is at once diſcharged, and as the wound ſeldom heals immediately, the water or ſerum is thus allowed to drain off almoſt as quickly as it is ſecreted. But in the event of the diſeaſe returning after the wound in the cornea is healed, as a repetition of the operation in this part might induce a cicatrix of ſuch a ſize as would injure viſion, I ſhould think it better to make an opening into the poſterior chamber of the eye, directly behind the iris, either with the point of the knife above mentioned, or with a very ſmall trocar. This inſtrument, if not thicker than a crow's quill, and made of a flat or lancet-point form, will penetrate the coats of the eye with almoſt as much eaſe as a round couching needle; and an opening made with it will diſcharge the aqueous humour of the eye with more certainty than an opening of an equal ſize made in any other manner.

The

The patient's head being properly ſupported by an aſſiſtant, the eyelids may be ſufficiently ſeparated by the operator himſelf, with the fingers of one hand, whilſt, with the other, the trocar is puſhed into the moſt depending part of the eye: The point of the inſtrument ſhould enter at a tenth part of an inch behind the iris, and be carried to ſuch a depth, that the end of the canula may be completely covered by the coats of the eye, when the ſtilette ſhould be withdrawn; and as much of the aqueous humour being allowed to run off, as is judged proper, the canula may be taken out, when the opening will require no further attention. With a view, however, to ſtrengthen the eye, and, if poſſible, to prevent a return of the diſeaſe, the parts may be frequently bathed with an aſtringent waſh; ſuch as cold water with a proportion of brandy, a ſolution of alum, or a decoction of oak-bark. In this manner a complete removal of the diſeaſe may in ſome inſtances be obtained; and as it gives at leaſt ſome chance of preſerving

ſerving the eye, I do not heſitate to recommend it in preference to the uſual practice of allowing the tumor to become ſo large before being opened, as to produce in almoſt every inſtance an entire loſs of the organ.

When the tumor has become ſo large as to deſtroy viſion entirely, it has been propoſed to diſcharge the contents of it, by paſſing a ſmall ſeton or cord through the eye: But in an organ of ſuch delicate mechaniſm, whoſe parts are all extremely irritable, there is reaſon to imagine that more pain and inflammation would in general enſue from this, than from a free inciſion made with a knife, or with a lancet; and as the full intention of the operation may be obtained by this means, it ſhould therefore, I think, be preferred.

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SECTION XI.

Of Blood effuſed in the Cavity of the Eyeball.

A FREE paſſage of the rays of light to the optic nerve, ſo neceſſary for a perfect ſtate of viſion, requires a clear and tranſparent ſtate of the different humours of the eye. We find accordingly, that viſion is always greatly impaired, in many inſtances even deſtroyed, by any of the humours becoming opaque, and nothing tends more certainly to induce opacity of the aqueous humour than blood being effuſed in it.

Blood may be effuſed in the aqueous humour of the eye, by various cauſes. In ſome inſtances it has been the effect of putrid diſeaſes, either producing a diſſolved ſtate of the blood; or ariſing more probably from a relaxed ſtate of the ſolids, by which the red globules of the blood are admitted

admitted into veſſels and parts which do not naturally receive them, and by which all the ſecretions are in theſe diſeaſes frequently tinged with blood. Blood is ſometimes poured into the eye, too, as the effect of an inflamed ſtate of this organ; but we meet with it more frequently, as the conſequence of a ruptured bloodveſſel from external violence, than from any other cauſe. It frequently enſues from blows on the eye, and from wounds that penetrate the poſterior chamber. In ſome inſtances, too, wounds that penetrate the anterior chamber only are ſucceeded by effuſions of blood; but this is not frequent, as the veſſels of this part of the eye are in general ſo ſmall that they do not admit red blood.

In whatever manner blood may be effuſed in the eye, if it mixes with the aqueous humour, ſo as to render it opaque, and is not ſoon abſorbed, it ought to be diſcharged by an operation. In a few caſes, we obſerve, that a ſmall quantity of blood is effuſed in the eye, without exciting

ting any inconvenience, by its ſinking immediately below the axis of viſion, and remaining in this ſituation without mixing with the aqueous humour. In this caſe, no attempt ſhould be made for removing it; for, as long as it continues at the bottom of the eye, no harm is done by it; and we have it always in our power to remove it, if, at any period in future, it is found to diſſolve in ſuch a manner in the aqueous humour as to render it opaque, or materially to injure viſion. The method of performing this operation ſhould be the ſame with that which I have pointed out in the laſt ſection, for the removal of dropſy of the eye.

The opening ſhould be about three-tenths of an inch in length, and be made as near to the moſt depending part of the tranſparent cornea as the junction of the iris to the coats of the eye will permit: In order to promote the diſcharge of the blood, the patient ſhould be deſired to turn his face downwards, and the ſides of the divided cornea may be ſomewhat ſepa-

rated by the end of a blunt probe. As the aqueous humour will be diſcharged along with the blood, the eye will appear to be much diminiſhed by the anterior part of it collapſing. This, however, is a matter of little importance; for the wound in the cornea commonly heals ſoon, and the aqueous humour is in general quickly renewed. The only application required after the operation, is a compreſs of ſoft lint moiſtened in a weak ſolution of ſaccharum ſaturni.

SEC-

SECTION XII.

Of Ulcers on the Globe of the Eye.

IN Chapter IV. the theory and management of ulcers were fully conſidered; ſo that I ſhall refer to what I there endeavoured to eſtabliſh: But ulcers on the eye merit particular attention; for we have here not only the cure of the ulcers to keep in view, but means muſt be employed to prevent or remove thoſe marks or ſpots which they almoſt univerſally produce, and which very commonly terminate either in a total or partial loſs of ſight. In other parts of the body, the cicatrix induced by an ulcer is ſeldom productive of much inconvenience; but in the eye, the cicatrix of even the ſmalleſt ſore does much harm. It is evident, however, that this effect of ulcers muſt depend much on the part of the eye on which they

are ſeated. Thus, we obſerve, that even large ulcers form on the tunica conjunctiva without viſion being injured; whilſt they commonly deſtroy it entirely when ſeated on the tranſparent cornea: Our prognoſis therefore, muſt in general, in a great meaſure, depend on their ſituation; for ſores, which in one part of the eye might be of little importance, will in others render the organ uſeleſs.

The danger ariſing from ulcers on the eye, depends in ſome meaſure, too, upon their form, which we find to be equally various here as in other parts of the body; but the ſtructure of the eye renders the form of any ſore that occurs in it of more importance than it can poſſibly be in any other ſituation. In ſome inſtances, ulcers upon the eye are very ſuperficial, being no deeper than the tunica adnata; whilſt in others they are ſmall, narrow, and penetrate to a conſiderable depth. Thoſe which ſpread upon the ſurface of the eye may deſtroy viſion by the cicatrix which they produce; but the deep-ſeated

ulcers

ulcers are not only attended with this effect, but very commonly terminate in an evacuation of the aqueous humour, either from their penetrating immediately through all the coats of the eye, or from their leaving ſuch a weakneſs in ſome particular part, as admits of the aqueous and other humours forcing a paſſage for themſelves.

In other caſes again, inſtead of a loſs of ſubſtance being produced by ulcers, the parts become ſoft and fungous, and excreſcences or granulations ſhoot out, as we frequently find to be the caſe in ſores of other parts of the body.

Ulcers of the eye may ariſe from various cauſes; ſuch as wounds, contuſions, and burns. And they may be induced by a general diſeaſe of the conſtitution; ſuch as lues venerea, and ſcrofula. But in moſt inſtances they may be traced as the effect of inflammation terminating in ſuppuration; for abſceſſes in the eye are often met with; and every abſceſs terminates in an ulcer, excepting in a very few

inſtances; in which they either continue during life, or in which the matter, inſtead of being diſcharged by an opening, is abſorbed into the ſyſtem.

Ulcers of the eye are not only often induced by inflammation, but it commonly happens, that inflammation is the moſt troubleſome ſymptom with which they are attended: Indeed the pain ariſing from an inflamed ſtate of an ulcer on the eye, proves in ſome inſtances ſo very diſtreſsful, as to induce reſtleſneſs, heat, quickneſs of pulſe, and every other ſymptom of fever: So that in the treatment of theſe ulcers, this ſymptom of inflammation requires our moſt ſerious attention.

When they are found therefore to be in an inflamed ſtate, blood-letting, both general and local, ſhould be employed; together with bliſters, laxatives, and cooling applications to the eye, in the manner pointed out in Section II. of this Chapter, for the cure of Ophthalmia: For till the violence of this ſymptom abates, no remedy we can employ for the cure of the ulcers will

will anſwer the purpoſe: In other caſes of ophthalmia, along with general evacuations, I have urged, in a particular manner, the propriety of local blood-letting, by ſcarifying the turgid veſſels of the eye. In ulcers of the eye, too, where enlarged veſſels are obſerved to paſs from the ſores over a conſiderable part of the eyeball, it often proves uſeful to cut theſe veſſels completely acroſs; not only for the removal of inflammation, but for the cure of the ulcers. From obſerving the effects indeed that reſult from this, I think it probable, that the diſcharge ariſing from ulcers of the eye is commonly ſupplied by the turgid veſſels that run into them; for it often happens, that the ſores are cured by this remedy alone, when every other means have failed. The operation, however, requires to be very neatly and ſteadily performed; for when deep and extenſive ſcarifications are made in the neighbourhood of an ulcer, they are apt to degenerate into tedious ſores of a ſimilar nature. This, however, is not the fault of the remedy,

but of the method of putting it in practice: for it is an effect I have never obſerved to reſult from it, when the turgid veſſels only have been divided; which may be eaſily done in the manner I have mentioned in Section II. of this Chapter.

Some have objected to this practice, that by dividing the lymphatics, which proceed from the ſores along with the turgid bloodveſſels, the healing of the ſores will be rendered more tedious than it otherwiſe would be; for theſe, by abſorbing the matter ſecreted or diſcharged into ulcers, they conclude muſt have a conſiderable influence on the cure: And therefore, it is ſaid, that we ſhould not run the riſk of dividing them, by ſcarifying the large veſſels of the eye, which they very commonly accompany. The idea is ingenious; but ſo far as I have obſerved, it is not ſupported by experience. Scarifications, when improperly performed, may in ſome inſtances, as I have obſerved above, do harm; but in many

many caſes of ulcers of the eye, I have known them prove very uſeful. Beſides, we might, from reaſoning alone, conclude, that ſcarification, when properly performed, ought not to do harm; and that the doubts which have been entertained with reſpect to it, cannot be well founded: For although ſome proportion of the matter afforded by ulcers is no doubt carried off by abſorption, yet daily experience ſhows, that we are never to depend upon this for effecting a cure; and, on the contrary, that ſores are more frequently cured by applications, that ſeem to act by deſtroying the power of the abſorbents, as well as of the other veſſels with which ulcers are ſupplied, than by any other means; namely, by drying aſtringent remedies, and by external preſſure, applied with ſuch firmneſs as muſt frequently annihilate the ſmaller veſſels of ſores, by keeping them for a conſiderable time cloſely compreſſed together.

After

After the inflammatory ſtate of an ulcer on the eye has been removed in the manner I have mentioned, our views ſhould be exactly the ſame as in the treatment of ſores in other parts of the body; and the means employed for effecting them, muſt, for the moſt part, be likewiſe ſimilar. When it appears to be connected with any general diſeaſe of the ſyſtem, this muſt be corrected before any permanent cure can take place. In ſome inſtances, ſores on the eye are combined with lues venerea; in which caſe a well-directed mercurial courſe is alone to be truſted to: But they are much more frequently combined with ſcrofula; a diſeaſe which often affects the eyes more than any other part of the body; and hitherto we have not been ſo fortunate as to diſcover any certain remedy for its removal. Cold bathing, however, with the uſe of muriated barytes, ſteel mineral waters, bark and other tonics, and living in a dry atmoſphere, frequently prove uſeful; and for the ſymptom that we are now conſidering, namely,

ulcers

ulcers on the eyes, iſſues, when duly perſiſted in, are to be more depended on than any remedy with which we are acquainted.

In the local treatment of ſores upon the eye, the remedies to be employed muſt depend entirely on the appearances which take place. Before any attempt is made to induce the formation of a cicatrix, any fungous excreſcences which occur muſt be deſtroyed; and if the matter diſcharged is thin, and the bottom of the ulcer foul, theſe circumſtances muſt be corrected. With this view, detergent ointments and waſhes, as they are called, ſhould be applied; and for the removal of excreſcences, the ſcalpel and eſcharotics are alone to be depended on.

A general prejudice prevails againſt the uſe of ſtimulating applications to the eye; and in many of the diſeaſes to which this organ is liable, they certainly cannot be employed with propriety; but in others, eſpecially in ulcers, they may not only be applied with ſafety, but with much advantage:

advantage: in many inſtances a cure cannot be otherwiſe obtained, and much miſchief is daily done by the contrary practice of a long-continued uſe of emollients. In caſes of ophthalmia, accompanied with much pain and tenſion, a proper uſe of emollients, particularly of warm fomentations and cataplaſms, proves in ſome inſtances extremely uſeful; but in ulcers of the eye, after the inflammation is removed, inſtead of being productive of any advantage, I have conſtantly obſerved them do harm. They not only ſeem to promote that tendency to relaxation and ſpongineſs which uſually occurs in theſe ſores, but in different inſtances they have appeared to be the ſole cauſe of thoſe excreſcences very frequently met with in ulcers of the eye, and which always prove extremely troubleſome. When I firſt engaged in practice, I entered into a free uſe of remedies of this claſs, in ulcers as well as in other affections of the eyes; but I now think it fair to acknowledge, from repeated inſtances of their proving hurtful,

that I am convinced that they ſhould be employed with caution.

When the ulcers are hollow, with foul edges, and diſcharge thin and perhaps fetid matter, a liniment of wax and oil, with a ſmall proportion of red precipitate, commonly anſwers the purpoſe of cleanſing them; or the ſame intention may be obtained from a remedy of the ſame nature, prepared with white vitriol, or with a ſmall proportion of verdigris; care being taken to have the liniment of ſuch a thin conſiſtence, that with a ſmall bruſh or pencil a little of it may be eaſily applied at any time over the ſurface of the ſores. By adding a ſmall proportion, too, of camphire to theſe ointments, their effects in cleanſing ulcers of the eye are frequently improved; and the ſame remedy proves ſometimes uſeful in a diſſolved ſtate, when employed as a waſh to the ſores. The moſt effectual waſh, however, for this purpoſe, is either a weak ſolution of verdigris or white vitriol in water; and I have in ſome inſtances employed, with advantage,

advantage, a weak ſolution of corroſive ſublimate. One grain of corroſive mercury in four ounces of water, makes a ſolution of a ſufficient ſtrength for this purpoſe.

Practitioners not accuſtomed to the application of irritating ſubſtances to the eye, may be ſurpriſed to find red precipitate, verdigris, and even corroſive ſublimate, recommended; but daily experience ſhews, that in many diſeaſes of this organ, they may be employed both with freedom and utility.

When by a due continuation of theſe means, or of remedies of a ſimilar nature, an ulcer on the eye is properly cleanſed, and a good ſuppuration induced, granulations will ſoon be obſerved to form; any deficiency of parts which may have been induced by the ſore will be filled up; and, if no interruption occurs to the cure, a cicatrix will ſoon be obtained.

It often happens, however, in this ſtate of the ulcer, that a cure is difficult to accompliſh. The ſurface of the ſore remains

ſoft, and becomes ſomewhat elevated above the reſt of the eye, by which a cicatrix is prevented. In this ſituation, drying aſtringent applications prove moſt uſeful. The parts affected ſhould be covered once or twice daily with lapis calaminaris finely levigated; with prepared chalk, or crabs-eyes; and they may be bathed morning and evening with a ſtrong ſolution of alum; with brandy properly diluted; or with a ſtrong infuſion of galls or oak-bark: by theſe means, when the conſtitution is otherwiſe healthy, a cure will in general be obtained.

When, again, the ſore, inſtead of being hollow and attended with a deſtruction of ſome of the parts in which it is ſeated, is found to be covered with a fungous production, this excreſcence muſt be removed before any permanent cure can be obtained; and the ſame means muſt be employed for the purpoſe here, that prove moſt effectual for the removal of excreſcences in other parts of the body.

In

In ſome inſtances, theſe productions arrive at a conſiderable ſize, and, after ſeparating the eyelids, fall down upon the upper part of the cheek. Of this, different caſes are recorded by authors; ſome of which were on diſſection found to be connected with the more interior parts of the eye, and in which extirpation of the eye might have ſaved the patient: But it ſometimes happens, that tumors of this kind adhere to the ſurface of the opaque cornea only, when they may commonly be removed without any material injury being done to the eye. In general, we are directed to remove theſe excreſcences with ligatures; but as this commonly proves painful, tedious, and uncertain, the ſcalpel or lunar cauſtic ought in every inſtance to be preferred.

For the removal of a large excreſcence, exciſion by the ſcalpel ſhould alone be truſted; and when done with caution, no danger enſues from it. The patient being firmly ſeated oppoſite to a clear light, and the ſurgeon ſitting before him, his head

ſhould

ſhould be ſupported by an aſſiſtant behind, who at the ſame time ſhould ſeparate the eyelids, by elevating the one and drawing down the other; which may be eaſily done by the fingers of each hand properly placed on them. This being done, a needle armed with a firm waxed ligature ſhould be paſſed through the centre of the excreſcence, for the purpoſe of fixing it and raiſing it as much as poſſible from the ſurface of the eye: With one hand the operator ſhould now lay hold of this ligature, while with a ſcalpel in the other he ſlowly and ſteadily removes the excreſcence. The only dreſſing that ſhould be applied, is a piece of ſoft lint ſoaked in a weak ſolution of ſaccharum ſaturni, laid over the eyelid; and if the ſore produced by the operation does not heal eaſily, ſome of thoſe aſtringent applications ſhould be employed that I have juſt had occaſion to mention.

But in the treatment of excreſcences of the eye which are neither pendulous nor

much elevated, there is no neceſſity for the uſe of the ſcalpel, as they may almoſt always be removed by a proper application of cauſtic. By touching the ſurface of the part intended to be deſtroyed with a piece of lunar cauſtic, either daily or once in the two days, the protuberance will ſoon be removed; and the ſore being in this manner reduced to the level of the reſt of the eye, a cure may be obtained by the means I have already mentioned.

It is neceſſary, however, to remark, that in the application of cauſtic to the eye, much ſteadineſs and nicety is required; but with due attention it may be done with perfect ſafety, and often with much advantage. In order to prevent the reſt of the eye from ſuffering by coming in contact with the cauſtic, the eye ſhould be previouſly fixed with a ſpeculum; and after the excreſcence is rubbed over with cauſtic, before removing the ſpeculum it ſhould be entirely waſhed off with

with a ſmall bruſh or pencil ſoaked in warm water; or in warm milk, which proves commonly more effectual than any other liquid for deſtroying the activity of cauſtic. In this manner, all the advantages may be obtained from the uſe of lunar cauſtic that we daily derive from it in the removal of excreſcences in other parts of the body; and when applied with caution, it may be done without riſk.

I have already remarked, that when the conſtitution is ſound, ulcers of the eye will commonly heal by the means that I have mentioned; but it happens in ſome inſtances, that they ſtill continue obſtinate, and even daily become more virulent, notwithſtanding the uſe of theſe and all the other remedies that are employed: In which event, whenever the diſeaſe has advanced ſo far as to deſtroy viſion, and when it is ſtill proceeding to increaſe, as nothing but extirpation of the morbid parts will afford any chance of prevent-

ing it from ſpreading to the contiguous ſound parts, this ought certainly to be adviſed. The method of extirpating a diſeaſed eye will be the ſubject of a different ſection.

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SECTION XIII.

Of Specks or Films upon the Eye.

VISION is frequently deſtroyed or impaired by opaque ſpots or films forming upon the eye; a diſeaſe commonly termed Leucoma, Albugo, or Nubecula.

Theſe ſpots are met with occaſionally on the ſclerotica or white part of the eye; but, as the inconvenience that enſues from them in this ſituation is ſeldom of much importance, they do not often become the object of ſurgery: but in the tranſparent part of the eye, they require very ſerious attention; for in this ſituation, even the leaſt degree of opacity is apt to terminate in the entire loſs of viſion: And although we cannot in every inſtance remove them entirely, yet we can often do ſo, and, by proper treatment, we have

it frequently in our power to preſerve eyes which otherwiſe would in all probability be loſt.

I have already given a deſcription of various affections that may tend to obſtruct viſion, by inducing an opaque ſtate of the tranſparent cornea and humours of the eye. Thus, every high degree of inflammation; the ſtaphyloma, hypopion, and ulcers on the tranſparent part of the eye; are all attended with this effect: But as each of theſe forms a diſtinct diſeaſe, requiring a method of treatment peculiar to itſelf, I have judged it proper to allot a ſeparate ſection for each of them; and, what I now mean to conſider, are thoſe white opaque ſpots frequently met with on the cornea, which occur moſt commonly as the conſequence of inflammation.

Affections of this kind are for the moſt part, indeed, ſo evidently induced by inflammation, that it may be doubted if they ever occur from any other cauſe; for all thoſe ſpecks which ſucceed to wounds

wounds of the cornea, as likewiſe thoſe which ariſe from ſmall-pox and meaſles, are always preceded by an inflamed ſtate of the eye: I therefore conclude, that they depend, perhaps entirely, on inflammation, by whatever cauſe this may at firſt be excited.

In attending to the nature of theſe opaque ſpots on the cornea, it appears ſufficiently obvious, that in moſt inſtances they are the effect of that effuſion, which inflammation, when in a high degree, always excites. In ſome caſes, when it terminates in complete ſuppuration, a ſmall abſceſs is produced; which, either on burſting, or on being opened in the manner directed in a preceding ſection, very commonly leaves an opaque ſpot, attended with ſome degree of prominency or elevation of the parts in which it is ſeated: But in others, when the effuſion, inſtead of being near to the ſurface of the cornea, is diffuſed among the different lamellæ of which this coat of the eye is compoſed; or when the degree of inflammation which

takes place is not ſufficient for carrying it on to ſuppuration, the opacity induced by it does not, as in the caſe of an abſceſs, form a protuberance; but appears rather to conſtitute a part of the ſubſtance of the cornea itſelf. In the one, the different lamellæ of the cornea are evidently ſeparated from each other; and on the matter contained between them being diſcharged, the ſpeck which remains appears in the form of an adventitious body, adhering to, but not intimately connected with, that part of the eye on which it is ſeated: Whereas, in the other, that is, when a ſmall effuſion only has taken place, and when no tendency to ſuppuration occurs, although a very conſiderable degree of opacity may be produced by it, yet the niceſt examination will not diſcover the cornea to be at this part either elevated or increaſed in thickneſs. In this caſe, the diſeaſe appears to form a part of the eye itſelf, and cannot be ſeparated from it but with the deſtruction of the organ; whereas, in the other, the appearances which it exhibits

are ſuch as would lead one to conſider it as a preternatural formation; and in many inſtances it may be removed without much injury being done to the eye.

Theſe ſpots upon the eye are met with in various forms and in different degrees of magnitude; but the inconvenience which they induce is always in proportion to their extent, to their degrees of opacity, or to their ſituation with reſpect to the pupil; for as they prove hurtful merely by preventing the rays of light from paſſing to the bottom of the eye, it is evident that it is by one or other of theſe circumſtances that this muſt be determined. When a ſpot upon the eye, therefore, is either ſo ſmall, ſo ſlightly opaque, or ſo far removed from the pupil, as not to injure viſion, it ought not to be conſidered as an object of ſurgery; for till the uſe of the eye is impaired by it, as it is never attended with pain, unleſs when the parts are inflamed, no other conſideration can render it proper to meddle with

with it: For every practitioner knows, that this organ is ſo very delicate, as often to ſuffer more by the means employed for removing diſeaſes, than it previouſly did by the diſeaſes themſelves. But whenever viſion is materially impaired, we are then authoriſed to endeavour to remove the cauſe by thoſe means which experience has ſhewn to prove moſt fit for the purpoſe.

I have endeavoured to ſhew that inflammation is to be conſidered as the principal and perhaps the only cauſe of ſpecks upon the eye: This ſhould therefore be a powerful argument, in every inſtance of inflammation of the eye, for loſing no time in the application of the moſt efficacious remedies; for, whenever it has gone ſo far, as to induce even the ſmalleſt degree of effuſion, we can never with certainty prevent either a partial, or perhaps a total loſs of ſight. The means beſt adapted for the removal of inflammation having been already detailed in Section II. of this Chapter, it is not neceſſary to repeat them; ſo that

that I ſhall now mention thoſe remedies only on which we ſhould chiefly depend for the cure of ſpecks that are already formed.

In the management of ſpecks upon the eye, it is a matter of much importance to attend to the particular nature of each of them; for the two varieties I have mentioned are ſo different from each other, that ſuch remedies as prove uſeful in the one, are ſcarcely, if at all, admiſſible in the other: And hence we find, that the ſame applications being indiſcriminately employed in every caſe, much injury is done which ought not to happen; and remedies fall into diſcredit, which, when properly applied, prove highly uſeful.

Thus, we find by experience, that eſcharotics of a moderate ſtrength may with ſafety be applied to the eye; and as ſpecks upon the cornea are often removed by them, it has long been a common practice to apply them with equal freedom in every caſe. By attentive obſervation,

however, to this branch of practice, I am convinced, that it is in one variety of the diſeaſe only that remedies of this claſs ever prove uſeful; namely, in that which is attended with an evident prominency or elevation of the diſeaſed part. In ſuch inſtances, when the cornea beneath is ſound, the removal of this elevated opaque ſpot will leave it tranſparent, and fit for the purpoſes of viſion; and in ſuch caſes, mild eſcharotics may with much propriety be employed: But in the other variety of the diſeaſe, where the effuſed matter ſeems to ſpread through the whole ſubſtance of that part of the cornea in which it is ſeated, without raiſing or elevating any part of it, no advantage is ever obtained from eſcharotics. In this caſe, the diſeaſed part of the cornea, as I have formerly mentioned, does not ſeem to be thicker than the other parts of it; and it is impoſſible to deſtroy the effuſed matter without deſtroying the cornea itſelf. In ſuch circumſtances, the employment of eſcharotics can never be proper; and

and I have no heſitation in ſaying, that in this ſtate of the diſeaſe, they can never be uſed but with much riſk of doing harm.

It ſometimes happens, however, even in this variety of the diſeaſe, that the patient recovers either a partial or even a complete uſe of his eye, by the opacity in the cornea being gradually carried off, probably by abſorption taking place of the effuſed matter. As this has in ſome inſtances happened by a natural exertion of the ſyſtem, practitioners ſhould endeavour to aſſiſt this operation of nature, by employing ſuch remedies as are known to prove moſt powerful in promoting abſorption: With this view, there is nothing perhaps to be more depended on than a gentle courſe of mercury. In ſimilar effuſions in other parts of the body, mercury often proves uſeful; and it is the only internal medicine, which, ſo far as I have yet ſeen, ſhould ever be employed in films or ſpecks on the eye: Iſſues have in ſome inſtances, too, appeared to prove uſeful;

and

and as a cord in the neck in general diſcharges freely, it commonly anſwers the purpoſe in the moſt effectual manner.

With the ſame view, too, a briſk purgative given from time to time, proves ſometimes uſeful; but it muſt be acknowledged, that the effect of our practice in this diſeaſe is always uncertain: For, although in a few caſes, ſome advantage has apparently been derived from theſe remedies, it has not happened ſo frequently as to admit of our placing much dependence on any of them.

But although we ſeldom derive advantage in this variety of the diſeaſe, either from internal medicines or external applications, it often happens in the other, that a due attention to the different circumſtances of the caſe proves highly uſeful. As in this caſe we ſuppoſe the diſeaſe to be produced by a thin lamella of the cornea being elevated and ſeparated from the reſt of the tunic beneath, by an effuſion of ſome kind of matter, and as this ſeparated portion is in general opaque, our chance

chance of effecting a cure is to remove it entirely. Even this will not always leave the eye perfectly clear and tranſparent; for it ſometimes happens, either from the effuſed matter having been of a ſharp corroſive nature, or from its having been long confined, that a roughneſs, attended with ſome degree of opacity, is left upon that part of the cornea which remains. This, however, is not univerſally the caſe; and, at any rate, although a complete cure may not in every caſe be obtained by the removal of the elevated part of the cornea, yet in almoſt every inſtance ſome benefit will enſue from its being thus made to admit a greater quantity of light to paſs to the retina.

Spots of this kind may be removed either with the knife or with eſcharotics; but, in general, the knife ſhould be preferred. The head being ſecured by an aſſiſtant ſtanding behind, and the eye properly fixed with a ſpeculum, Plate XIV. fig. 1., the ſurgeon ſhould ſeat himſelf in a convenient height between the patient and the clear

clear light of a window; when, with repeated ſmall ſtrokes of the knife, Plate XII. fig. 4., he ſhould endeavour to cut away and remove all that portion of the cornea that he finds to be in any degree ſeparated from the reſt; for no part of it that is looſe will ever adhere again, and the cure will not be complete if any portion of it is allowed to remain.

The natural delicacy and irritability of the eye would appear to render this operation difficult; but it may be done with eaſe by ſurgeons of ſteadineſs and obſervation. The ſpeculum I have mentioned fixes the eye completely; and on the head being properly ſecured, the operation may be done with entire ſafety. The knife I have mentioned, is in moſt caſes the beſt; but in a few inſtances a knife with two edges I have thought has anſwered better. A repreſentation of a knife of this kind may be ſeen in Plate XVI. fig. 1.

Patients, however, will not always ſubmit to this operation: In which caſe we are obliged to employ eſcharotics; by a

continued

continued uſe of which we have it often in our power to remove blemiſhes of much firmneſs and of conſiderable extent: and although ſtrong applications of this kind are not admiſſible, and have frequently done harm, by creating inflammation and pain, yet I think it right to remark, that there is no cauſe for ſo much caution on this point as in general we are led to believe; for daily experience ſerves to evince, that a good deal of freedom may be uſed in the application of remedies of this claſs to the eye. It has been alleged, that, beſides exciting pain and a temporary ſtate of inflammation, eſcharotics muſt do harm by corroding and inducing ulceration on the ſound part of the eye, juſt as readily as they will deſtroy the ſpot intended to be removed. This reaſoning is ſpecious, but not ſupported by experience; for every practitioner muſt have obſerved, and it is particularly well known to itinerants, who commonly uſe no delicacy in matters of this kind, that ſpecks upon the cornea are frequently removed by eſcharotics,

without any kind of harm being done to the reſt of the eye; and the fact, I think, may be explained. So far as I have able to obſerve, thoſe ſpecks in which eſcharotics are employed with moſt advantage, conſiſt of a ſubſtance in which there is little or perhaps no animal life; at leaſt they are perfectly white, are deſtitute of the circulation of red blood, and are ſo far inſenſible, that little or no pain is experienced from their being cut or even bruiſed with much freedom. Now we know, that in other inſtances, eſcharotic or corroſive applications of a moderate ſtrength will deſtroy a part of a dead animal, which did not in any degree act on it during the life of the animal. This is particularly remarkable in a proceſs that ſometimes occurs in the ſtomach after death; a curious fact, firſt taken notice of by the late ingenious practitioner Mr John Hunter. The ſtomach has frequently been found on diſſection to have holes corroded in it, even where no pain or other

ſymptom

ſymptom of diſeaſe of this organ had previouſly exiſted; from whence we may fairly conclude, that the liquor gaſtricus, or that fluid which nature has provided for the purpoſes of digeſtion, although during the life of the animal it may act only as a moderate ſtimulus to the viſcera, yet after death, the ſtomach being now deprived of the power of reſiſting the corroſive property of this liquor, comes at laſt to be deſtroyed by it. In the ſame manner we may ſuppoſe, that a dead lifeleſs ſpot may be removed by corroſive applications, the ſtrength of which is not ſufficient to affect the living part of the eye.

We may thus perhaps account for the cauſe of this phenomenon; but whether this reaſoning ſhall appear to be well founded or not, the fact, as I have ſaid, is certain, that corroſive applications may be made to the eye ſufficiently ſtrong for removing many of thoſe ſpots to which it is liable, without doing any injury to the reſt of the organ.

For a conſiderable time I was afraid to apply ſtrong eſcharotics to the eye: further experience, however, has convinced me, that they may be uſed with more ſafety than is commonly imagined.

Remedies of this kind may be uſed in different forms; but they are moſt conveniently employed in the form of a powder, an ointment, or a waſh. When powders are uſed, they ſhould be very finely levigated; otherwiſe, by their ſpiculæ, they are apt to irritate and inflame the eye: and, for the ſame reaſon, when conjoined with ointments, they ſhould be very finely prepared. Articles of this kind that are ſoluble in water, are perhaps preferable to any; for, in the form of ſolution, they can never prove hurtful if their ſtrength is duly regulated, as in this manner none of their ſharp ſpiculæ can come in contact with the eye.

In the form of a powder, various articles have been employed; but the moſt effectual perhaps of any is red precipitate, or verdigris finely levigated, mixed

with three or four parts of fine ſugar. Calcined alum, too, white vitriol, and levigated glaſs, likewiſe mixed with a proportion of ſugar, or with egg-ſhells in fine powder, have frequently proved uſeful.

Ointments for the ſame purpoſe are prepared, by adding to fine hogs-lard, or any emollient ointment of the ſame conſiſtence, ſuch a proportion of any of the powders I have mentioned as the patient is able to bear; and waſhes are made by diſſolving a due proportion of the ſubſtance to be employed, in water. For this purpoſe, verdigris or white vitriol are employed with advantage; and in ſome inſtances I have known good effects reſult from a weak ſolution of corroſive ſublimate. The following is a form of ointment much employed by Mr Pellier, both for the removal of ſpecks and inflammation. ℞. Mercur. precip. rub. Lapid. Calam. pp. $\overline{aa}$ ʒiſs. Lythargyr. pp. ʒi. Tutiæ pp. ʒſs. Cinnab. nativ. ℈i. F. pulv. tenuiſſim.: miſce cum axungiæ porcinæ ʒii. et adde balſam. Peruvian. gutt. xv.

Of this, a little is introduced on the end of a blunt probe, between the eyelids, evening and morning, at the ſame time that a weak ſaturnine ſolution is employed as a waſh.

It is impoſſible, in caſes of ſpecks upon the eye, to confine any application to the diſeaſed part: all we can do is to inſert the powder, ointment, or waſh, within the eyelid; by the motion of which it is very quickly conveyed over the whole ſurface of the eye. In order, however to have every poſſible advantage from remedies of this claſs, their uſe ſhould be long continued, and two or even more of them ſhould be employed at the ſame time. Thus, a ſmall quantity of any of the powders or ointments I have mentioned, may be inſerted within the eye evening and morning, and a weak ſolution of corroſive ſublimate, of verdigris, or white vitriol, may be employed two or three times a-day for waſhing the eye.

It cannot be alleged, that theſe or any other remedies will in every inſtance prove effectual;

effectual; but I can with confidence ſay, that a prudent and long-continued uſe of them has often removed ſpots upon the eyes, which otherwiſe would probably have terminated in an entire loſs of viſion.

SECTION XIV.

Of Protruſions of the Globe of the Eye from the Socket.

EVERY practitioner muſt have met with inſtances of the eye being puſhed more or leſs from its natural ſituation in the ſocket, and various cauſes are recorded of it by authors.

1. A partial protruſion of the eyeball takes place in ſome of the diſeaſes of which we have treated in the preceding ſections; particularly in the hypopion, ſtaphyloma, and dropſical ſwellings of the eye.

2. The eye may be diſplaced or puſhed from its ſocket by external violence. And,

3. It may be raiſed or elevated by tumors forming beneath it.

Even the ſlighteſt diſtortion or diſplacement of the eye affords a very diſagreeable

agreeable appearance; and to thoſe not accuſtomed to meet with it, gives much cauſe to ſuſpect that viſion will be completely deſtroyed by it. All ſuch affections have therefore been in general conſidered as incurable: Little or nothing has accordingly been done for removing them; ſo that patients labouring under them have for the moſt part been allowed to finiſh a miſerable exiſtence without any means being employed for their relief. But although viſion cannot in every affection of this kind be preſerved, yet in moſt inſtances it may be done; and wherever there is any chance of this being in our power, the attempt ſhould undoubtedly be made.

As the means of cure muſt depend upon the cauſe by which the diſeaſe is induced, it is a point of the firſt importance to have it aſcertained.

When the ball of the eye is enlarged from any of the cauſes I have mentioned; namely, from water, pus, or any other fluid collected in any part of it, if a portion of it is by this cauſe puſhed forward, all

all that art can do is to diminiſh the ſize of the eye in the manner I have mentioned in different parts of the preceding ſections, either by puncture, inciſion, or perhaps, by removing a part of it. In moſt caſes of this kind, viſion will be irrecoverably loſt; but by the means I have mentioned, the deformity produced by the diſeaſe may be commonly removed.

When, again, the eyeball is puſhed from its ſocket by external violence, as the optic nerve muſt in this caſe be ſuddenly ſtretched, we might *à priori* conclude, that viſion would be deſtroyed by it. This will moſt frequently be the caſe; but it does not always happen: For, inſtances have occurred of the eye being puſhed ſuddenly and entirely out of the ſocket, and on being replaced, of viſion being as perfect as it was before.

Several years ago I met with an inſtance of this, in which the eye was almoſt entirely turned out of the ſocket by a ſharp-pointed piece of iron puſhed in beneath it.

The

The iron paſſed through a portion of the ſocket, and remained very firmly fixed for the ſpace of a quarter of an hour; during which period the patient ſuffered exquiſite pain; he was quite blind in the affected eye; and the eyeball being puſhed ſo far out as to give reaſon to ſuſpect that the optic nerve was ruptured, it was doubted whether it would anſwer any purpoſe to replace it or not. As no harm, however, could ariſe from a trial being made of it, I reſolved to make the attempt; and with much pleaſure and aſtoniſhment I found, on removing the wedge of iron, which being driven to the head was done with difficulty, that the power of viſion inſtantly returned even before the eye was replaced. The eye was now put eaſily into the ſocket; and the effects of inflammation being guarded againſt, the patient enjoyed very perfect viſion.

A caſe of a ſimilar nature to this is recorded by a very ingenious practitioner, Mr White of Mancheſter: In which the eye was ſtill more completely diſplaced than

than in the one I have mentioned, and in which the power of viſion was ſcarcely affected *.

As in theſe caſes the attempt to ſave the eye proved ſucceſsful, where the eyeball remains entire, and is not altogether ſeparated from the contiguous parts, we ought not to deſpair, however ſevere the injury in other reſpects may have been: Nay, we here have evidence of no material inconvenience having enſued even from a ſudden extenſion of the optic nerve. No ſuch caſe therefore ſhould be conſidered as incurable, till it has actually proved to be ſo by the power of viſion being entirely loſt after every endeavour for preventing it has failed. All extraneous bodies being removed, the eye ſhould be cautiouſly replaced; and with a view to prevent or render moderate the inflammation, which otherwiſe might probably run high, blood-letting, both general and local, ſhould be adviſed, together with a ſtrict antiphlogiſtic

* Vide Caſes in Surgery, &c. By Charles White, F. R. S. &c.

giſtic regimen. At the ſame time, light ſhould be excluded from the eye, and it ought to be kept covered with a ſoft compreſs moiſtened in a weak ſaturnine ſolution.

When the eye is puſhed out by a tumor ſituated beneath it, the cure muſt depend on a removal of the cauſe. When an abſceſs or a collection of any kind of fluid is attended with this effect, a cure may be obtained merely by laying the cyſt or abſceſs ſufficiently open: But when the tumor is firm, it muſt be entirely removed.

Here I think it neceſſary to remark, that practitioners are in general too timid in operating on tumors of this kind, owing to their near contiguity to the eye; inſomuch, that when a tumor is ſituated entirely within the orbit, a patient is commonly adviſed rather to allow it to remain than to ſubmit to an operation. As long as no material inconvenience enſues from ſuch tumors; when they are not likely to degenerate into a worſe nature; and when they appear to remain ſtationary without receiving

receiving any additional increaſe; it would ſurely be improper to adviſe a patient to undergo the pain and terror of an operation: But whenever they begin to acquire an additional bulk; when there is any reaſon to fear that they may ever become cancerous; and eſpecially when they begin to impede the motion of the eye, and to puſh it out of the ſocket; no further delay ſhould be admitted. In ſuch circumſtances, the ſafety of the patient requires the tumor to be removed, and it ought to be done without delay.

Even where theſe tumors have acquired a conſiderable bulk, they are more eaſily removed than is commonly imagined. By proceeding cautiouſly, they may often be taken out without hurting the eye, even where they paſs deep into the ſocket. But where the eye has already been puſhed from its ſituation, as nothing but the removal of the tumor can in any degree prove uſeful, it ought in every inſtance to be done, even although there ſhould be ſome riſk of the eye being hurt by it: For,

beſides

beſides the injury which ſuch tumors do to the eye, when they increaſe to any conſiderable bulk, by preſſing on the contiguous bones, they very commonly bring theſe likewiſe into a ſtate of diſeaſe. In ſome inſtances, the bones become carious, and produce tedious ulcers; but moſt frequently they ſwell, become ſoft, and on being laid open, inſtead of the uſual appearances of bone, they are found to conſiſt of a clear gelatinous matter. In this ſtate of the diſeaſe, no advantage can be derived from extirpating the tumor, ſo that it ought not to be adviſed; but this diſtreſsful ſituation may very commonly be guarded againſt, by the operation being done more early.

It ſometimes happens, that the eye is puſhed from its ſocket by an enlargement of the glandula lachrymalis. This forms a kind of tumor, of more difficult management than any other to which theſe parts are liable: We ought not, however, even in this caſe, to deſpair of effecting a

cure;

cure; for even this gland, in a ſtate of enlargement, has been entirely removed, without injuring the eyeball; and there will ſeldom be much difficulty in replacing the eye, on the cauſe being removed by which it was puſhed out.

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SECTION XV.

Of Cancer of the Eye, and Extirpation of the Eyeball.

THE eye, like every part of the body, is liable to cancer, a diſeaſe that cannot be cured by any remedy with which we are acquainted, and which therefore renders the removal of the diſeaſed part neceſſary, in order to prevent it from extending farther.

Cancer of the eye is apt to ſucceed to ſtaphyloma: The ball of the eye, after becoming enlarged, at laſt protrudes beyond the boundaries of the ſocket: It acquires a firm, and even a hard conſiſtence: Viſion is at laſt deſtroyed, and the tumor commonly acquires a red or fleſhy appearance. In ſome inſtances, a yellow glutinous matter, but moſt frequently a thin acrid ichor, is diſcharged from the ſur-

face of the tumor. For a conſiderable time the patient complains only of heat, or a ſenſation of burning in the ſubſtance of the ſwelling; but at laſt he becomes diſtreſſed with ſevere pains, ſhooting through the whole of it, and acroſs the brain to the oppoſite ſide of the head.

In this ſituation, blood-letting, opiates, and the external uſe of emollients, are commonly adviſed, with a view to render the pain moderate; but although in ſome inſtances this may be done by large doſes of opiates, yet no remedy will prevent the diſeaſe from ſpreading; and as it is always a point of importance to remove cancerous tumors early, the operation ought always to be adviſed as ſoon as the diſeaſe appears to be evidently formed.

In Chapter IV. Section VIII. we entered fully into the conſideration of Cancer. I there made it appear, that extirpation of the diſeaſed part is the only remedy on which we ought to depend; that it often ſucceeds when employed early in the diſeaſe; that it muſt neceſſarily frequently fail,

fail, when the operation is long delayed; and that practitioners have till of late years been often blamable, in having an ill-founded averſion to this operation, by which their patients have in many inſtances been prevented from ſubmitting to it ſo early as they ought to have done. For a more particular diſcuſſion of this point, I muſt refer to the ſection I have mentioned; but it is here neceſſary to remark, that this general averſion to operate in caſes of cancer, has been carried ſtill further, when the diſeaſe is ſeated in the eye, than in any other part of the body.

This general objection prevails againſt the extirpation of cancer wherever it is ſeated, that the diſeaſe is ſo apt to return, that the advantage to be derived from it is ſeldom equal to the pain, trouble, and confinement that ariſe from it. This, I have elſewhere ſhewn, is by no means the caſe: But when the diſeaſe is ſeated in the eye, another objection has been raiſed to it; namely, the hazardous nature of the operation; for, as it is im-

poſſible, from the depth of the orbit, to ſecure any arteries with ligatures that lie at the under part of it, it has been ſuppoſed that much danger muſt occur from this circumſtance alone: And accordingly, although we find the method of extirpating the eye has long been deſcribed in books, excepting by a few practitioners, the operation has been very ſeldom performed.

There is no cauſe, however, for this timidity: for although a good deal of blood is ſent to the eye by different branches both of the internal and external carotid arteries; yet, at the place where theſe are divided in extirpating the eye, they are commonly ſo much ramified, that no hazard, ſo far as I know, has ever occurred from this operation; and I have not only done it frequently, but in various caſes I have ſeen it performed by others. It is not the extirpation of a portion of the eye, namely, that part of it which protrudes beyond the orbit, that we are now conſidering, but the total removal of the whole eye,

eye, when it is altogether diſeaſed. A partial extirpation of the eye is often indeed recommended, chiefly for the reaſon I have mentioned, the danger that is ſuppoſed to occur from a deep diviſion of the ocular artery: but whenever the eye is in a cancerous ſtate, as all the diſeaſed parts muſt be removed in order to render the patient ſafe; as I have endeavoured to ſhew that the eye may be altogether cut out without hazard; and as no advantage can be derived from a portion of it being allowed to remain; we ſhould never heſitate in removing the whole. The method of performing the operation is this.

The patient ſhould either be firmly ſeated in a proper light, with his head ſupported by an aſſiſtant; or, what anſwers better in every tedious operation, he ſhould be laid upon a table, with his head upon a pillow; the moſt convenient poſture not only for himſelf but for the operator. When the eyelids are diſeaſed, they ſhould be removed along with the eye itſelf; but whatever part of them is ſound, ſhould be

allowed to remain as a protection to the orbit.

In the courſe of the operation, it is a point of importance to have the palpebræ kept completely ſeparate; for the moſt part this may be done by the hands of aſſiſtants, but in ſome caſes where the ball of the eye is much enlarged, the palpebræ are more eaſily ſeparated by means of two flat hooks, one of which is repreſented in Plate XIII. fig. 1.

When the eyeball has become ſo large as to protrude beyond the orbit, the operator will in general be able to lay hold of it with his fingers; but when this cannot be done, a broad flat ligature ſhould be paſſed through the centre of the tumor, in order to fix it during the operation. While this is done with one hand, the ſurgeon, with a common ſcalpel in the other, muſt endeavour to ſeparate the whole ball of the eye from the different parts to which it is connected. All the diſeaſed parts ſhould be removed; but care ſhould be taken not to injure the bones; for

for as in ſome parts of the body they are extremely thin, much harm might enſue from their being hurt.

On the eye being taken out, the attention of the operator is firſt directed to the hemorrhagy: But although in ſome inſtances this may take place to a conſiderable degree, yet it does not often happen; for in general, the diſcharge of blood in this operation is ſo inconſiderable as ſcarcely to require the aid of compreſſion to put a ſtop to it. But whenever it proceeds too far, it may be eaſily ſtopped by preſſure; or, a piece of dry ſponge being applied to the mouths of the bleeding veſſels, preſſure may alſo be employed, by ſtuffing the reſt of the orbit with ſoft lint and applying a napkin over the whole, ſo as to make it preſs with ſome firmneſs on the ſponge beneath.

When ſponge, however, is employed, ſome attention is neceſſary in applying it; for when ſponge is applied to the mouth of a bleeding artery, it is apt to adhere ſo firmly as to require a good deal of force,

as well as ſome management, to remove it. Before inſerting the ſponge, therefore, a piece of ſtrong waxed pack-thread ſhould be tied to it; by which it may be pulled out when the hemorrhage is ſuppreſſed.

As ſoon as a free ſuppuration takes place, the bandage and lint will be eaſily removed; and the only neceſſary dreſſing is a pledget of emollient ointment, to be continued as long as any diſcharge of matter takes place from the orbit.

In performing this operation, I have adviſed the common ſcalpel to be employed; and I have no heſitation in ſaying, that it is preferable in every reſpect to any inſtrument that has yet been propoſed. Different forms of ſcalpels have been invented for this operation, particularly one with a conſiderable degree of curvature. As this has been in ſome inſtances employed, I have give a view of it in Plate XXI. fig. 1. But it does not anſwer the purpoſe ſo well as the ſtraight ſcalpel; and in uſing it, we are more apt to injure the bones of the orbit.

The

The operation I have deſcribed, namely, the extirpation of an eye, is attended with much pain to the patient, and appears to be of a cruel and dangerous nature to by-ſtanders; ſo that few ſurgeons have reſolution to perform it. It ought in no inſtance to be adviſed where a cure can be accompliſhed by more gentle means; but when this cannot be done, and when a patient will for certain die in miſery if the eye be not removed, it ought ſurely to be adviſed as the moſt certain means of affording at leaſt ſome chance of ſafety: For although it will not always anſwer, yet we know from experience, that in ſome inſtances lives have been ſaved by it, which otherwiſe would probably have been loſt. We ought, however, to remember, that in every caſe of cancer, extirpation proves, cæteris paribus, moſt ſucceſsful when practiſed early; ſo that it ſhould always be adviſed in cancer of the eye, as ſoon as it is evident that the diſeaſe is completely formed.

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SECTION XVI.

Of Artificial Eyes.

AS the loſs of an eye is always productive of much deformity, our being in ſome meaſure able to obviate this, is not unfrequently a deſirable object; and by the ingenuity of modern tradeſmen, it is eaſily done.

A thin concave plate of glaſs, ſilver, or gold being fitted to the orbit, muſt be coloured ſo as to match the other eye as nearly as poſſible; and if care is taken to render it perfectly ſmooth, it may be introduced beneath the palpebræ, and uſed without exciting pain. Of all theſe ſubſtances, however, glaſs is the moſt proper; for it not only can be made to reſemble the natural eye more exactly than the others, but it is much more cleanly. It has been objected to the uſe of glaſs indeed, that it is apt to break by blows and other

other accidents: Of many, however, who I have known uſe this artificial eye, I do not remember an inſtance of any who ever were hurt by it.

An artificial eye may be fitted to any orbit, where the eye has either been ſunk by the evacuation of part of its contents, or where a portion of the eyeball has been removed: But it ſeldom happens that any advantage is derived from this invention where the globe of the eye has been entirely taken away; for when not ſupported beneath, the artificial eye ſinks too deep into the orbit, and can never be made to fit properly. It is chiefly, therefore, in caſes of hydrophthalmia and ſtaphyloma in which it has been found neceſſary to evacuate a portion of the contents of the eye, or perhaps to remove ſome part of it, that artificial eyes prove uſeful.

SECTION XVII.

Of CATARACTS.

§ 1. *General Remarks on Cataracts.*

VARIOUS definitions have been given of the term Cataract; ſome of which are ſufficiently accurate, but others have rather tended to convey an improper idea of the nature of the diſeaſe.

Blindneſs, induced by an opaque body immediately behind the iris, forms the diſeaſe we name Cataract; and as we find from diſſection that this opacity is in every inſtance ſeated in the cryſtalline lens, or in its inveſting membrane, a cataract may with propriety be defined, to be a deprivation of ſight induced by an opaque ſtate of the lens or of its capſule.

The real ſeat of cataract being a late diſcovery, we need not be ſurpriſed at finding

finding very perplexed and contradictory accounts of it in all our ancient chirurgical authors. By ſome it was conſidered as an affection of the internal ſurface of the cornea; others imagined that it was ſeated in the vitreous humour; whilſt by many it was ſuppoſed to be produced by a new formation of a membranous ſubſtance within the cavity of the eye. By ſome this new production was ſuppoſed to be attached to the coats of the eye; while others alleged that it uſually continued looſe, and floated in the aqueous humour. Some writers of eminence, too, appear to have confounded the gutta ſerena with this diſeaſe, the former being often mentioned and deſcribed under the name of the Black Cataract.

The fact, however, is now aſcertained, that cataract, in a pure unmixed form, depends entirely on a diſeaſed ſtate of the lens or of its capſule; and its appearance indeed is ſo diſtinctly marked, that no practitioner of experience can ever miſtake it: But for the advantage of beginners,

ners, and of others not accuſtomed to this branch of buſineſs, I ſhall, in the firſt place, give a ſhort hiſtory of the riſe and progreſs of the diſeaſe; and ſhall afterwards endeavour to point out ſuch circumſtances as diſtinguiſh it more particularly from ſome other affections of the eye.

Inſtances ſometimes occur, in which cataracts form ſuddenly, and a total loſs of ſight, with complete opacity in the lens, takes place at once without any previous affection. This, however, is rare; and it commonly happens, that the diſeaſe approaches in a very gradual manner, from a ſlight degree of dimneſs, with which it commences, to an entire loſs of viſion.

The firſt ſymptom that uſually occurs in cataract is what the patient terms a weakneſs of ſight, and which commonly takes place long before any alteration is perceived in the ſtate of the lens. By degrees this weakneſs, or rather dimneſs of ſight, becomes more conſiderable; and the

the patient, being from his feelings led to ſuppoſe that it is in ſome meaſure produced by duſt or motes floating in the air, or by ſome opaque matter upon the external ſurface of the cornea, is often employed in rubbing his eyes; and is ſurpriſed to find that his ſight never becomes clearer from his doing ſo.

If in this ſtate of the diſeaſe the eye is examined, the lens will be obſerved to have acquired a duſky hue; and inſtead of being clear and diaphanous, which it naturally is, it will be found to be ſlightly opaque. By degrees the dimneſs of ſight becomes more diſtreſsful, till at laſt it terminates either in total blindneſs, or perhaps the patient may be able to diſtinguiſh light from darkneſs; but in the advanced ſtages of the diſeaſe, he can ſeldom diſtinguiſh colours, excepting thoſe of the brighter kinds, nor can he find his way in roads where he is not perfectly acquainted.

In proportion to the degree of blindneſs that takes place, the lens is obſerved to become

become more and more opaque, till at laſt it is found to be either entirely white, or of a light gray or pearl colour. In a few inſtances this whiteneſs is confined to a ſmall portion of the lens, and forms a ſmall opaque ſpot in ſome particular part of it; but in general, the whole body of the lens is equally diſeaſed.

During the whole courſe of the diſeaſe, the pupil contracts and dilates according to the degree of light in which it is placed; at leaſt this will be always obſerved when the eye is not otherwiſe diſeaſed. Cataracts, however, are often combined with gutta ſerena; in which caſe the pupil is not affected by any degree of light we apply to it: This, indeed, does not proceed from the ſtate of the lens, but from the diſeaſed ſtate of the optic nerve.

Cataracts are not commonly attended with pain; but in ſome inſtances it is otherwiſe, when every expoſure to light creates much uneaſineſs. This, however, is always to be conſidered as an accidental circumſtance, depending probably on

ſome degree of inflammation at the bottom of the eye, and not as a neceſſary ſymptom of cataract.

I have already obſerved, that cataract has been confounded with other diſeaſes. This however, can only happen from inattention; for there is ſcarcely any other diſeaſe to which it bears much reſemblance. But in books, we find it has been miſtaken for the gutta ſerena; for the hypopion and ſtaphyloma; and it has been confounded with white opaque ſpots on the cornea.

It is eaſily diſtinguiſhed, however, from all of theſe. In cataract, the pupil contracts when expoſed to much light, and an opaque body is obſerved behind the iris: whereas in an unmixed caſe of gutta ſerena, the pupil remains in a ſtate of dilatation whatever degree of light is applied to it, and no opacity is obſerved at the bottom of the eye: It is diſtinguiſhed from the hypopion, ſtaphyloma, and white ſpots upon the cornea, by the evident marks of diſeaſe which in all of theſe

take place in the anterior part of the eye, the cornea itſelf; which in all of them is opaque, and which in the hypopion and ſtaphyloma is commonly elevated into a ſmall tumor or protuberance: Whereas in cataract, the only ſymptom that occurs, is, blindneſs to a greater or leſs degree, attended with a white opaque ſpot behind the iris, the cornea and every other part of the eye remaining perfectly ſound. I have already obſerved, that this opacity is found by diſſection to depend upon a morbid ſtate of the lens. For the moſt part it is the body of the lens only that is diſeaſed; ſo that the opacity is removed, and the eye appears perfectly clear on this being taken out: But in a few inſtances, the membrane or capſule that ſurrounds the lens is the ſeat of the diſeaſe; ſo that the ſame degree of opacity ſtill continues even after the lens is removed.—This, however, is not a frequent occurrence; but it is ſometimes met with, and is with ſufficient propriety termed the Membranous Cataract.

It

It is difficult, or perhaps impoſſible, to aſcertain the proximate cauſe of cataract; but I think it probable, that it conſiſts in ſome degree of obſtruction of the veſſels of the lens, in ſome inſtances induced by external violence, but moſt frequently by ſome internal cauſe, for which we cannot properly account.

The exiſtence of veſſels in the cryſtalline is doubted indeed by many, who imagine that nouriſhment is conveyed to it by the ſmall quantity of fluid that we meet with in the capſule of the lens.—But the fact I conſider as eſtabliſhed, that the lens is ſupplied with veſſels from its capſule, injections having been made to paſs from one to the other, not only in different animals, but in ſome inſtances in the human eye. But whether this could have been demonſtrated or not, the exiſtence of veſſels in the lens, is rendered, I think, ſufficiently probable, by a circumſtance I took notice of in the hiſtory of the diſeaſe, namely, the ſudden formation of cataracts, which in a

few caſes has been obſerved. I have now met with ſeveral inſtances of this; in ſome of which the moſt complete degree of opacity took place in the cryſtalline in the courſe of a few hours from the firſt ſenſation of dimneſs; a fact that cannot be ſo readily explained on any other ſuppoſition.

It may be alleged, where the cataract is ſo ſpeedily formed, that the opacity may ariſe from diſeaſe in the veſſels of the capſule, and not of the lens itſelf. In ſome inſtances this may be the caſe; but in more than one of thoſe to which I allude, the diſeaſe appeared to be fixed in the body of the cryſtalline, and the capſule remained perfectly ſound; for on the lens being extracted, the opacity was entirely removed.

In confirmation, too, of this opinion, of cataracts being probably produced by ſome degree of obſtruction in the veſſels of the lens, I may remark, that they occur more frequently in women about the ceſſation of the menſes than at any other period;

riod; and we know that this period is particularly productive of obſtructions in other parts of the body.

As long as the opinion prevailed of there being different ſpecies of cataracts, a variety of means were adviſed in the method of cure; but now that the real nature of the diſeaſe is known, our ſole object is to remove the opacity of the lens; or when this cannot be done, we remove the lens itſelf from the axis of viſion.

In confirmed cataracts of long duration, no advantage is ever derived from any internal medicine; but in the incipient ſtate of the diſeaſe, before the opacity of the lens is complete, mercury has in ſome caſes proved uſeful. When inflammation takes place, blood-letting both general and local; the application of bliſters to the temples, together with a ſtrict antiphlogiſtic regimen, ſhould be adviſed; and I have in a few caſes derived advantage from the operation of briſk purgatives; but nothing I have ever tried has anſwered ſo well as ſmall doſes of calomel often

repeated. Extractum hyoſcyami, flammula jovis, and other vegetable productions, have likewiſe been celebrated for their efficacy in cataract; but no trials that I have given them, and I have uſed them all in different inſtances, can juſtify the recommendation.

When mercury, and the other remedies we may employ, are found to fail, our next object, as I have already obſerved, is to remove the diſeaſed lens from the axis of viſion: This we accompliſh by one or other of two chirurgical operations, namely, by preſſing the lens from its natural ſituation in the centre down to the bottom of the eye, an operation commonly termed Couching the Cataract; and that operation which we denominate Extraction of the Lens, by which the diſeaſed body is taken entirely out of the eye.

Each of theſe operations has been much employed; ſo that the merits of both ought long ago to have been aſcertained: But although the ſubject is of the higheſt importance,

portance, it ſtill remains in a ſtate of uncertainty. By ſome practitioners, couching is preferred; whilſt others conſider extraction of the lens as the only remedy on which we ſhould place any dependence.

The uncertainty in which we ſtill remain upon this point, proceeds, I believe, from this branch of practice having hitherto been for the moſt part in the hands of itinerants: And as practitioners of this denomination, have uniformly from their firſt outſet in life, adopted one method of operating only, they have very univerſally condemned the other; which they themſelves neither practiſe, nor perhaps underſtand: So that regular practitioners, not being able to determine from their own experience, they have in general remained upon this point very undecided. But the public appearing now to be convinced of the propriety of intruſting this, as well as every other operation of importance, to eſtabliſhed ſurgeons of reputation, opportunities will thus be afforded of determi-

ning the point in queſtion by experiment; the only means by which any degree of certainty can be obtained.

In proſecuting the conſideration of this ſubject, I ſhall endeavour to point out as clearly as poſſible the reſult of my own obſervations upon it, together with that of ſome of our beſt employed ſurgeons. With this view, I ſhall firſt deſcribe the operation of couching; and after conſidering the different ſteps of the operation of extracting the cataract, I ſhall attempt to draw a juſt compariſon of the merits of the two.

§ 2. *Of* Couching, *or* Depression *of the* Cataract.

I have already obſerved, that the operation of couching conſiſts in preſſing the cataract or diſeaſed lens from its natural ſituation in the centre down to the bottom of the eye. By this means the opacity producing the

the diſeaſe is removed from the axis of viſion; and although the ſight is never ſo perfect as before the lens became opaque, when the eye is otherwiſe ſound it proves quite ſufficient for the common purpoſes of life.

In the anatomical deſcription of the eye, which makes the ſubject of the firſt part of this chapter, we have ſeen, that the lens is placed behind the pupil, where it is lodged in a ſlight depreſſion of the vitreous humour, to which it is attached by a capſule, formed by a portion or lamella of the tunic which includes the vitreous humour itſelf. In couching, the lens is ſeparated from its capſule; and being preſſed down behind the iris, if the operation ſucceeds, it either remains there during life, or is diſſolved in the aqueous humour in which it is lodged.

Before we proceed to this operation, ſome circumſtances in a particular manner require attention; the moſt material of which are, the degree of opacity in the lens,

lens, and the ſtate of the eye with reſpect to other diſeaſes.

It is a fact well known to practitioners, that no operation can be performed on the eye, but with the riſk of inducing inflammation; a ſymptom that proves tedious, or otherwiſe, according to the conſtitution of the patient, and other circumſtances of the caſe. This points out the propriety of proceeding with caution, and of attempting no operation on this organ, not abſolutely neceſſary for the welfare or comfort of the patient. Where a patient is rendered ſo blind by cataracts in both eyes, that he cannot conduct himſelf in the common occurrences of life, we ſhould not heſitate in adviſing an operation for his relief. In ſuch circumſtances, any riſk of his ſuffering from inflammation is more than counterbalanced by the advantages he may derive from the operation. But when one eye only is loſt, and the patient enjoys a perfect uſe of the other; or where even both eyes are diſeaſed, if the opacity of the cryſtallines is not ſo conſiderable

derable as to prevent the patient from managing his ordinary buſineſs; or if it does not deprive him of his ſight in any conſiderable degree; in any of theſe circumſtances, a prudent practitioner will rather avoid an operation, and will adviſe it to be delayed as long as viſion remains tolerably perfect.

The ingenious Dr Richter of Gottingen is indeed of opinion, that the exiſtence of cataract in one eye is particularly apt to produce a ſimilar affection in the other, and therefore he adviſes the cryſtalline to be removed as ſoon as it becomes entirely opaque, whether it is diſeaſed in the other eye or not. The propriety, however, of this advice can be only determined by further obſervation; but it often happens, that together with an opaque ſtate of the cryſtalline, the eye is in other reſpects ſo much diſeaſed, as to afford no hopes of viſion being reſtored by the cataract being removed; in which caſe, as no advantage could be derived from an operation, it ought not to be adviſed. This is particularly

ticularly the caſe in the hypopion, in the gutta ſerena, and in every affection of the eye attended with an opaque ſtate of the cornea.

Writers on this ſubject mention another reaſon, by which they think that practitioners ſhould be determined, when the operation in caſes of cataract ſhould be adviſed. It has very univerſally been ſuppoſed, that a cataract ought to be in a particular ſtate, in order to enſure ſucceſs from an operation; inſomuch that we are adviſed never to operate unleſs this ſtate of the diſeaſe is found to prevail. The ſtate to which I allude, is a ſuppoſed ſtate of maturity, which it is believed every cataract will ſooner or later arrive at, and which is ſaid to be clearly and evidently pointed out by certain appearances of the opaque cryſtalline.

It is true, that both in the operation of couching and extracting the cataract, the lens is ſometimes found to be partly ſoft and in part very firm, and in a few caſes it is even perfectly fluid; a circumſtance commonly

commonly conſidered as unfavourable: But although this may have firſt ſuggeſted the idea of the unripe ſtate of a cataract, as it is termed, yet no advantage has hitherto been derived from the diſtinction; for notwithſtanding a variety of ſigns have been mentioned, by which the real ſtate of a cataract is ſaid to be evidently marked, yet it does not appear to be ſupported by experience: On the contrary, we often find that a cataract is of a firm texture, that was previouſly ſuſpected to be ſoft; and vice verſa.

Nothing, indeed, can render it more obvious, that this idea of the mature ſtate of a cataract is ill-founded, than the variety of opinions that prevail reſpecting it: For while by ſome it is ſaid that this ſtate of the diſeaſe is indicated by a pure white or milky appearance, others aſſert, that a light grey or pearl colour is the moſt certain mark of it. Now, the fact is, that the real ſtate of a cataract can never be known from its colour; and the beſt-informed practitioners will allow, that no advantage

is

is to be derived from this means of diſtinction.

The idea of a cataract being more ripe at one period of the diſeaſe than at another, originated, as I have obſerved above, from the cryſtalline being in ſome inſtances found to be fluid, which gave cauſe to ſuſpect that the firſt effect of a cataract is to induce a ſoftneſs of the lens, and that this ſoft or fluid ſtate of it is gradually altered by the progreſs or continuance of the diſeaſe, by which it is ſuppoſed to acquire a firm conſiſtence, when it is conceived to be thoroughly ripe.

This opinion, however, of this being neceſſarily the firſt effect of a cataract upon the lens, is equally ill-founded with the idea I have mentioned, of the real ſtate of the diſeaſe being to be diſtinguiſhed by its external appearance; for we know from experience, that cataracts are often of a firm texture from the beginning. From my own obſervation, indeed, I would ſay, that the moſt frequent effect of cataract upon the lens is to produce a preternatural

natural degree of hardneſs through the whole of it; as, for the moſt part, an extracted opaque cryſtalline is of a firmer texture than it is ever found to be when healthy and tranſparent.

We are, therefore, to conclude, with reſpect to this circumſtance of the ripe or unripe ſtate of a cataract, that in the treatment of the diſeaſe no advantage is to be derived from any thing we yet know concerning it. In the common acceptation of the term, indeed, the word ripeneſs has in this reſpect no determined meaning affixed to it: I would therefore propoſe, that inſtead of being employed to ſignify the *appearances* of a cataract, it ſhould be applied only to expreſs the *effects* that ariſe from it. In this manner, the term might ſtill be retained with propriety; for we might very properly ſay that a cataract is ripe when the patient is rendered entirely blind by it, and when therefore it is ready for an operation; and, on the contrary, that the diſeaſe is ſtill in an unripe

ſtate,

ſtate, as long as viſion is not much impaired by it.

As the ſtate or conſiſtence of a cataract, is much inſiſted upon by almoſt all who have wrote on it, I here judged it right to enter on this inquiry; and, on the whole, this concluſion I think may be drawn from what has been ſaid, That in determining upon the propriety of operating, we are never to place any dependence on the appearance of the lens; that we are to be ſolely directed by the effects which cataracts produce, and by the ſtate of the eyes with reſpect to other diſeaſes. As long as viſion remains tolerably perfect, whether in both or only in one eye, for the reaſons I have given, a prudent practitioner would rather avoid the operation: But, when the ſight becomes much impaired, if the cornea is found to be tranſparent, and if the pupil dilates and contracts freely, according to the degree of light to which it is expoſed, we ſhould not heſitate in adviſing an operation as the only effectual means of relief. And when the

the operation of couching is agreed on, the following is the method of doing it.

As it is of importance in this as well as every operation upon the eye, to guard againſt inflammation, nothing ſhould be omitted that can in any way tend to prevent it: The patient ſhould be confined, for ſeveral days before the operation, to a low regimen: He ſhould loſe ten or twelve ounces of blood, and even more if his ſtrength admits of it, and two or three purgatives ſhould be given at proper intervals.

In performing this operation, and likewiſe in extracting the cataract, a large quantity of light is neceſſary; but no ſunſhine ſhould be admitted; for by the irritation which it excites, the eye is prevented from being kept ſo ſteady, even with a ſpeculum, as it otherwiſe may be. A north expoſure ſhould therefore be preferred.

The only apparatus to be provided for this operation, is a ſpeculum of a proper conſtruction, and of a ſize adapted to that of the eye; and an inſtrument termed a

needle, for the purpoſe of depreſſing the cataract. Different forms of the needle are repreſented in Plate XV.; and in Plate XIV. are delineated different views of the moſt uſeful ſpeculum that has yet been invented.

As it is of much importance to have the eye properly fixed during the whole courſe of the operation, and as this is beſt done with a ſpeculum exactly fitted to the eye, every operator ſhould be provided with ſeveral ſizes of this inſtrument.

The beſt needle for this operation is that of a flat form, repreſented in Plate XV. fig. 1.

The patient ſhould be placed upon a low ſeat with his face towards the window, and the ſurgeon, upon a chair conſiderably higher, ſhould be ſeated directly before him: An aſſiſtant ſtanding behind muſt be directed to ſupport the patient's head, which is moſt effectually done by placing one hand under the chin, and the other on the forehead; and in order to prevent interruption, the hands of the patient ſhould

ſhould be firmly ſecured by an aſſiſtant on each ſide.

During the operation, it is of much importance for the ſurgeon to have his hand and arm firmly ſecured: For this purpoſe, nothing anſwers ſo well as a proper reſt for the elbow, which ought therefore to be placed either upon a table, or on the knee of the operator raiſed to ſuch a height that it may be nearly on a line with the eye of the patient. Practitioners uſually truſt to the hand being ſecured by the ring and little fingers reſting on the cheek or temple of the patient: But this ſeldom proves ſufficient for the perfect ſteadineſs which operations on the eyes require; and whoever will make trial of the mode I have mentioned of fixing the elbow, will find it preferable. It is proper, indeed, that any advantage to be derived from reſting theſe two fingers upon the cheek ſhould be likewiſe laid hold of; but this alone ſhould not be relied on.

An ingenious author, who has lately written on the cataract, has communica-

ted ſome valuable practical obſervations to the public *. His method of giving ſupport and ſteadineſs to his hand during the operation of extracting the cataract, and the ſame obſervations, I may remark, apply with equal propriety to that of couching, is to preſs the upper part of the arm and elbow of that hand with which he performs the operation, ſtrongly againſt his own breaſt and ribs, and to reſt his little finger about an inch from the outſide of the eye, on the cheek-bone of the patient, at the ſame time that he retains his breath, and remains as much as poſſible in that ſituation, till the inciſion of the cornea is finiſhed.—He has alſo invented a chair, for the purpoſe of fixing the head of the patient, which he has uſed for many years with much advantage. He very properly obſerves, that in the uſual method of fixing the head, by preſſing it againſt the breaſt

* *Vide* A Treatiſe on the extraction of the Cataract, by Frederick Biſchoff, F. M. S. Oculiſt to his Majeſty in the Electorate of Hanover, and to her Majeſty in England.

breaſt of an aſſiſtant, that the leaſt motion, even that which occurs from the aſſiſtant drawing breath, muſt occaſion a correſponding motion of the head of the patient.—The chair that he has invented, is repreſented in Plate XXVIII., and it appears to be well calculated for the purpoſe for which it is meant.

Whether the patient is ſeated on this chair, or in the manner I have adviſed above, the aſſiſtant is now to raiſe the upper eyelid with the fingers of his left hand; and the ſurgeon applying the groove in the upper part of the ſpeculum, Plate XIV. fig. 1. in ſuch a manner that it may receive the edge of the eyelid, the opening or circle formed by the brim of the ſpeculum is to be preſſed upon the ball of the eye, till the tranſparent cornea, and nearly about an eighth part of an inch of the ſclerotica, is protruded; by which means, if a ſteady and equal preſſure is continued upon the eye, it will be kept firmly fixed without any injury being done to it, at the ſame time that a ſufficient

quantity of the ball will be left uncovered by the ſpeculum for the purpoſe of the operation.

I am at preſent ſuppoſing that the operation is to be performed upon the left eye. For this purpoſe, the patient being ſecured in the manner I have adviſed, the ſpeculum being applied and ſecured by the ſurgeon's left hand, and the ſurgeon himſelf being ſeated, with the elbow of his right arm fixed at a proper height, he muſt take the couching needle in his right hand, and having fixed it, as we do a pen in writing, between the thumb and fore and middle fingers, while the ring and little fingers are made to reſt upon the cheek or temple of the patient, the point of the inſtrument muſt now be made to paſs the external canthus of the eye; and being brought nearly in contact with the ſclerotica, it ſhould now be quickly plunged through this coat, ſomewhat below the centre of the eye, and about one-tenth of an inch behind the iris. In Plate XVII. fig. 1. is delineated a needle paſſed into the

the eye in this manner, by which a better idea is given of the operation than can be done by any deſcription.

In order to avoid the iris, the inſtrument ſhould be introduced with its flat ſurface towards this membrane, and ſhould be carried forward in a ſtraight direction till the point of it is diſcovered behind the pupil, as is repreſented in the figure I have mentioned. By depreſſing the handle of the needle, the point of it will be raiſed, and the flat ſurface of it being turned downwards, it muſt now be puſhed into the upper part of the cryſtalline, when the operator, by elevating the handle, muſt endeavour to carry the lens upon the point of the inſtrument down to the bottom of the eye; which will be inſtantly diſcovered, on the ſurgeon obſerving through the pupil that the cataract diſappears, and by the patient becoming ſenſible to the impreſſion of light.

Were we ſure of the lens continuing at the bottom of the eye, the needle might now be withdrawn, and the operation

would be finiſhed: But as we know from the anatomy of the eye, that there is a portion of the aqueous humour lodged between the vitreous humour and the iris; as it is into this part of the aqueous humour that the cryſtalline is depreſſed; and as this humour is of a conſiſtence too thin for preventing the action of the muſcles of the eye from raiſing the lens again on the preſſure of the inſtrument being withdrawn; we need not be ſurpriſed at the operation being frequently found to fail on being finiſhed in this manner.

Inſtead of this, on the cryſtalline being preſſed to the bottom of the poſterior chamber, it ſhould be ſlowly carried on the point of the inſtrument towards the outer and back part of the eye; a movement which is beſt accompliſhed, by the operator raiſing his hand ſo as to elevate the handle of the needle, at the ſame time that he makes it paſs ſomewhat outward over the cheek. In this manner, the cryſtalline is to be partly lodged below the vitreous humour; which being of a firm

conſiſtence,

conſiſtence, very commonly prevents it from riſing again; and being brought towards the external canthus of the eye, if it ſhould afterwards be forced up by the action of the muſcles, not being oppoſite to the pupil the paſſage of light to the retina will ſtill remain clear, and viſion will accordingly be no more affected than if the cataract had remained at the bottom of the eye.

As ſoon, therefore, as this movement is finiſhed, the needle ſhould be withdrawn; and there being now no further uſe for the ſpeculum, it ſhould likewiſe be taken off: But as it is of importance to have the eye properly fixed during the whole courſe of the operation, the ſpeculum ſhould not be removed till the whole is finiſhed.

On the inſtrument being taken away, practitioners commonly try what effect is likely to reſult from the operation, by preſenting different objects to the patient: But although no harm enſues from ſlight trials of this kind, they ſhould never be carried far; for they may do harm by tending

tending to promote inflammation, while no real advantage can ever ariſe from them.

After the operation, a compreſs of ſoft lint, ſoaked in a weak ſaturnine ſolution, ſhould be lightly applied over the eye; and this being retained by the bandage, Plate XXIX. fig. 1. the patient ſhould be confined in a dark apartment, and kept on low diet as long as there is any riſk of inflammation taking place: With the view, too, of preventing this, a doſe or two of a briſk purgative ſhould be exhibited; and, when neceſſary, blood ſhould be taken from the temporal artery, from the jugular vein, or from the neighbourhood of the eye, with leeches.

The eye ſhould be looked at daily, that the real ſtate of it may be known; but the patient, for a conſiderable time, ſhould be kept in an obſcure light, with his eyes ſufficiently covered.

For the moſt part, we diſcover in the courſe of a few days whether the operation is to ſucceed or not, but in ſome inſtances

ſtances the patient remains for a conſiderable time perhaps equally blind as before, and yet gradually recovers the power of viſion afterwards, ſo as to diſtinguiſh objects equally well as if the operation had proved ſucceſsful from the firſt. This I ſuppoſe to happen from ſome degree of inflammation being produced in the capſule of the lens, by the violence done to it by the couching needle, and till this is entirely removed, that the effect of the operation cannot be aſcertained.

On removing the coverings from the eye, if the cataract is not diſcovered, the object of the ſurgeon is completed; but if the lens has again got into its uſual ſituation, after a further delay for the purpoſe of allowing the inflammation induced by the firſt operation to ſubſide, another attempt ſhould be adviſed; and a ſecond or third I have frequently known to ſucceed, when the firſt had entirely failed: This, in a great meaſure ariſes from the circumſtance to which I have already adverted, the needle being withdrawn immediately

on

on the lens being preſſed to the bottom of the eye; for this being done, it is in general ſuppoſed that the operation is finiſhed. I have endeavoured, however, to ſhow, that this is by no means the caſe; and that the cataract will ſeldom riſe again if it be preſſed towards the external canthus of the eye, and gently puſhed beneath the vitreous humour.

Thoſe who have not operated in this manner, will perhaps object to it, that by forcing the lens into the vitreous humour, an unneceſſary violence is thus done to this part of the eye, by which it muſt be ſo much injured, as to have ſome influence on the ſucceſs of the operation. This, however, does not on experience appear to be the caſe; for I have often done the operation in this manner, and I never obſerved any harm enſue from it. We ſhould not wantonly hurt the vitreous humour; but we know that it is often much more materially hurt in extracting the cataract, and with little apparent detriment to the eye, than it can ever be in the operation of couching.

couching. Thus it often happens, in extracting the lens, that a conſiderable portion, or even the whole of the vitreous humour, is diſcharged, and yet the operation ſucceeds equally well as if no ſuch occurrence had taken place. This, indeed, every operator would rather wiſh to avoid; but it ſhows clearly, that no injury of importance can be done to viſion by the practice I have adviſed, of lodging the cataract in the operation of couching, partly beneath, or even entirely in, the ſubſtance of the vitreous humour.

The operation I have deſcribed is ſuppoſed to be done, as I have already obſerved, upon the left eye; for which purpoſe the right hand of the operator muſt be employed: But in operating upon the right eye, if the needle is to be entered in the uſual way, from the outer or external canthus of the eye, it muſt either be done with the left hand of the ſurgeon, or, if he wiſhes to uſe his right hand, he muſt either ſit or ſtand behind the patient, when, by ſupporting the head upon his breaſt

breaſt or upon his knee, he may in this manner accompliſh his purpoſe. This mode of operating upon the right eye has been frequently practiſed even by ſurgeons of eminence, but it is extremely awkward; and beſides, the operator can never have ſuch a full command of the eye when he ſits or ſtands behind, as when placed before the patient. Few ſurgeons, however, are ſo alert in uſing their left hand, as to be able to perform with it this very nice operation; ſo that with the uſual inſtruments there is no other alternative than that of doing it from behind. But in Plate XVI. fig. 4. and 5. there is delineated a form of needle, by which the operation may be done with eaſe and ſafety on the right eye with the right hand of the ſurgeon, whilſt he is ſeated before and oppoſite to the patient. Only in this caſe, inſtead of entering the inſtrument at the uſual place, by puſhing it inwards from the external canthus of the eye, it muſt be entered at the internal angle, and puſhed outwards, as is repreſented in Plate XVIII.

XVIII. fig. 1. In every other reſpect the operation is to be conducted as I have already directed; only, the cataract, inſtead of being carried to the external canthus of the eye, muſt in this caſe be drawn by the point of the needle towards the noſe. In this manner the operation may be done upon the right eye by any ſurgeon who can perform it upon the left; an improvement that many will judge to be important.

As the operation of couching is very univerſally performed without the aſſiſtance of a ſpeculum, it may be conſidered as an affectation of ſingularity to recommend one. In anſwer to this, I muſt obſerve, that although the cataract may be depreſſed without the uſe of a ſpeculum, it may be done more perfectly, and with more eaſe both to the patient and ſurgeon, when a ſpeculum is employed, than when it is not. By means of the ſpeculum, delineated in Plate XIV. as well as with that in Plate XXII. fig. 5. the eye may be very firmly fixed, which allows

allows the operator to manage the needle with more eaſe than can otherwiſe be done.

It has been commonly objected to the uſe of the ſpeculum, that it does not ſecure the eye ſufficiently; and that it always proves detrimental, by exciting inflammation over the eyeball. This obſervation, I believe, is well founded with reſpect to the inſtrument in ordinary uſe, of which a delineation is given in fig. 3. Plate XII. But it does not apply to either of the others; which, when properly fitted to the ſize of the eye, ſecure it exactly; and when finely poliſhed, never do harm.

Some practitioners, ſenſible of the impoſſibility of fixing the eye properly in the manner commonly attempted with the fingers alone, and finding the common ſpeculum inſufficient, have propoſed another inſtrument for this purpoſe: It conſiſts of a ſharp ſpear or prong, fixed in a handle, with a croſs flat bar near the point, as is delineated in Plate XII. fig. 2.

This inſtrument has long been employed in ſome parts of the Continent: It is uſed by puſhing the point of it through the ſclerotic coat on the ſide of the eye oppoſite to where the needle is to be entered; and it is prevented from penetrating far, by the croſs-bar with which it is furniſhed: In this ſituation, it is ſecured by an aſſiſtant on one ſide of the patient; and the eyelids being ſeparated by the ſurgeon himſelf, aſſiſted by the perſon behind who ſupports the head, the eye may in this manner be fixed in ſome degree, but never with ſo much eaſe and certainty as with either of the ſpeculums I have mentioned.

Needles of various forms and ſizes have been uſed in this operation; but the flat needle, fig. 1. Plate XV. anſwers the purpoſe better than any that I have tried. It ought not to be broader than this, otherwiſe it makes too large a cut in the coats of the eye; and if much narrower, it does not ſo readily carry the lens along with it. The round needle, fig. 2. of the ſame

Plate, has been much employed by many itinerants; but I have not found, upon trial, that it anſwers ſo well as the other. After piercing the cataract, it parts with it too eaſily: and beſides, it enters the coats of the eye with more difficulty, and it cannot be ſo eaſily moved when introduced as the other; which being broad in the cutting part of it near the point, the opening formed by it in the tunica ſclerotica is ſomewhat larger than the diameter of the reſt of the inſtrument, which admits of its being afterwards eaſily moved in every direction.

It has been objected to the flat needle, that by its breadth it is more apt than the round one to hurt the iris; but with the precaution I have mentioned, of introducing it with the flat ſurface towards this membrane, there can never be any hazard of this. The flat part of the needle may indeed be made too broad, and this I believe is very commonly done; by which the opening made with it is too large; more irritation is thus excited; and

when

when broad near the point, it does not ſo readily penetrate the lens as a narrow needle would do. The needle delineated in Plate XV. fig. 1. is in every reſpect of a proper ſize. Fig. 3. repreſents a needle with a ſmall degree of curvature, by which I have ſometimes thought that the cataract may be more eaſily depreſſed than with a ſtraight needle; but I have not yet uſed it ſo frequently as to be able to ſpeak of it with deciſion: In piercing the eye with it, the convex ſide of the curve ſhould be towards the iris, as this membrane would be apt to be injured, were it introduced in any other manner.

In deſcribing the operation, I deſired that the needle might be entered at one ſide of the eye, by paſſing it through the ſclerotic coat at the diſtance of one-tenth of an inch from the iris. And I likewiſe obſerved, that it anſwers the purpoſe better by introducing it ſomewhat below the centre of the eye, than if entered, as is uſually done, in a line with the centre of the pupil. It ought not, however, to be

far below this point. The twelfth part of an inch is fully ſufficient; for when the needle is introduced near the bottom of the eye, the cataract is not ſo eaſily depreſſed with it.

It has been ſaid by ſome, that the operation may be performed, not only with more eaſe, but with more ſafety, by introducing the needle through the tranſparent cornea, and after paſſing it through the pupil, to puſh down the cataract with the point of it to the bottom of the eye. It is not, however, probable, that this propoſal can ever be generally admitted, for it is not poſſible in this manner to depreſs the lens ſo eaſily as when the needle is entered in the manner I have adviſed, while it can ſcarcely be done without hurting the iris.

§ 3. *Of* Extracting *the* Cataract.

The operation of couching, or depreſſing the cataract, had been long practiſed, and

and was conſidered as the only means by which an opaque cryſtalline could be removed, till the year 1737, when an eminent oculiſt of Paris, Mr Daviel, firſt propoſed and practiſed the method of removing it by extraction.

It is true, that ſeveral years previous to this period, Mr Petit propoſed to make an opening through the tranſparent cornea, for the purpoſe of removing the lens when forced into the anterior chamber of the eye, either by accidental violence, or when puſhed through the pupil in the operation of couching, an occurrence which ſometimes happens: but, being conſidered as extremely hazardous, it was rarely practiſed; nor was it ever ſuppoſed to be proper in any other ſtate of the diſeaſe, till Mr Daviel, about the time I have mentioned, put it frequently in practice, in preference to the operation of couching. By ſome, the merit of this operation has been attributed to our countryman Taylor, a famous itinerant of theſe times; but this will not be admitted by any who have paid at-

tention to the hiſtory of it, given by thoſe who had the beſt opportunities of being able to judge of it.

This operation conſiſts in an opening being made through the tranſparent cornea, of a ſufficient ſize for admitting the paſſage of the lens after it has paſſed through the pupil into the anterior chamber of the eye. The operation itſelf was nearly, if not exactly, the ſame when practiſed at firſt by Mr Daviel, as it is at preſent; but the method of doing it then was more difficult and tedious, by a greater number of inſtruments being uſed in it than are now found to be neceſſary. At that period knives of different forms were employed; as alſo, ſciſſars, forceps, a lancet concealed in a canula for opening the capſule of the cryſtalline, as well as many others. In the preſent improved ſtate of this operation, the only inſtruments we employ are, a ſpeculum for fixing the eye; one or other of the knives, Plates XVI. XXII. and XXIX. a ſmall ſcoop, Plate XVI.

XVI. fig. 4. and a flat blunt-crooked probe, Plate XVIII. fig. 5.

In proceeding to this operation, the patient ſhould be placed in the ſame kind of light, and ſecured in the ſame manner as I have adviſed for the operation of couching. The ſurgeon ſhould likewiſe be ſeated in the ſame manner before the patient, and ought to reſt his elbow either upon a table, or upon his knee raiſed to ſuch a height as to bring his hand nearly on a line with the pupil.

This being done, if the operation is to be performed on the left eye, the ſpeculum muſt be applied in the manner I have adviſed in the operation of couching, and muſt be preſſed upon the eye with the left hand of the operator with as much firmneſs as is neceſſary for ſecuring the eye; but more than this ſhould be avoided, as it not only gives more pain, but is apt to preſs the cornea into too near contact with the iris; by which the latter is in great riſk of being injured in the ſubſequent ſteps of the operation.

The ſurgeon is now to take the knife between the thumb and fore and middle fingers of his right hand, allowing nearly an inch to project paſt the extremity of his middle finger; and the point of it being brought in contact with the lucid cornea, it muſt be made to penetrate this coat at the diſtance of the ſixteenth part of an inch or thereby from the iris, in a line running from the external canthus of the eye directly acroſs the centre of the pupil, as is repreſented in Plate XVII. fig. 2.

The convex ſurface of the knife being ſtill kept next to the iris, it muſt be carried ſlowly forward in this direction, till the point of it reaches the other ſide of the eye directly oppoſite to where it entered; and muſt here be puſhed out till nearly a quarter of an inch of it is freely through the cornea. The operator is now, in a gradual manner, to form a ſemilunar cut in the under part of the cornea, by moving the knife downwards in ſuch a manner, that all that portion of the cornea lying between

tween the point at which it entered and that at which it paſſed out, may be divided at an equal diſtance from the iris; as is repreſented in Plate XVII. fig. 4. In this manner an opening will be formed ſufficiently large for the paſſage of the cataract.

While this ſemilunar cut is forming in the cornea, the preſſure of the ſpeculum upon the eyeball ſhould be gradually leſſened, otherwiſe the vitreous humour will be forced out on the inciſion being finiſhed. We are adviſed indeed by ſome to remove the ſpeculum altogether on the knife being paſſed out at the oppoſite ſide of the eye; for which purpoſe they leave an opening on one ſide of the inſtrument, to admit of its being taken off, as is repreſented in fig. 3. Plate XIV. But with an operator accuſtomed to the uſe of the ſpeculum, there is no neceſſity for this precaution; for a degree of preſſure may be made with it ſufficient for fixing the eye, without any riſk of forcing out the vitreous humour; and by keeping the eye fixed

to

to the laſt, we are enabled to form the inciſion with more accuracy than can poſſibly be done when the ſpeculum is removed early in the operation. I have ſeen it indeed often done in this manner; but as ſoon as the eye has loſt the ſupport of the ſpeculum, the preſſure of the knife is apt to draw the eyeball too much down on the under edge of the ſocket, by which a ſmaller ſegment of a circle is commonly formed than is ſufficient for the paſſage of the lens; for by the eye being drawn ſuddenly down on the ſpeculum being removed, the under part of the inciſion is almoſt always formed at too great a diſtance from the iris, and is thus made too ſmall for the purpoſe.

When the eyeball has been too forcibly compreſſed by the ſpeculum, the cataract, together with all the aqueous humour, and a conſiderable portion of the vitreous, are very commonly preſſed ſuddenly out; but when this part of the operation is properly done, nothing but the aqueous humour paſſes out.

As

As ſoon as the inciſion is finiſhed, the operator muſt lay aſide the knife; and having lifted the flap formed in the cornea with the flat crooked probe, Plate XVIII. fig. 5. the point of it ſhould be paſſed through the pupil, in order to ſcratch an opening in the capſule of the lens; or this may be done with the inſtrument repreſented in Plate XXIV. fig. 2. & 3. This being accompliſhed, the cataract will either paſs out at the cut in the cornea, by the action of the muſcles of the eye; or when this does not happen, it muſt be forced eaſily out by very moderate preſſure, applied over the globe of the eye with the finger.

It happens indeed in ſome inſtances, that a good deal of preſſure is required to force the cataract out: But this always proceeds from ſome fault in the previous ſteps of the operation; almoſt univerſally indeed from the cut in the cornea being too ſmall, by which the lens is with difficulty forced through the pupil; or if it is made to enter the anterior chamber of the eye, it

does not paſs through the opening in the cornea with ſuch eaſe as it ought to do.

In this ſituation, it is the common practice to force out the lens by repeated applications of preſſure. This, however, ought never to be done; for nothing proves more deſtructive to the eye than violence applied to it in this manner: For beſides the loſs of the vitreous humour with which it is commonly attended, the iris is often materially hurt, and much inflammation induced by it.

When the lens cannot be eaſily removed from the anterior chamber of the eye by means of a ſcoop, and in every inſtance where it is with difficulty forced through the pupil, the operator, inſtead of perſiſting to employ much preſſure, ſhould rather enlarge the opening in the cornea, uſing for this purpoſe ſmall probe-pointed ſciſſars; and this being done, the operation falls to be finiſhed in the manner I have already adviſed.

With a view to render the paſſage of the lens as eaſy as poſſible, the pupil ſhould at this

this part of the operation be in the ſtate of the moſt perfect dilatation; for which purpoſe, after the inciſion of the cornea, and the opening of the capſule of the cryſtalline are completed, a dark cloth or curtain may be placed between the eye and the light, to be removed on the lens paſſing out; or the patient may be placed with his back to the window.

In a few inſtances of cataract, the cauſe of opacity is not found in the lens itſelf, but in its capſule: In this caſe, the extraction of the lens anſwers no good purpoſe, as the opacity is equally ſtrong after the operation as it was before. Some authors have therefore in ſuch circumſtances adviſed the opaque capſule to be removed with forceps and other inſtruments paſſed through the pupil; but this can never be done but with much riſk of deſtroying the iris, and doing much injury to other parts of the eye: It ought never therefore in my opinion to be attempted: We ſhould rather truſt to time, and an antiphlogiſtic regimen, for the removal of the opacity; from which

which no harm can enſue, and I have known inſtances of cures being performed by it: whereas the forcible extraction of the opaque capſule, ſo far as I have yet heard, has never in any caſe effected a cure; and it has frequently deſtroyed the eye entirely.

When, again, the operation is to be performed upon the right eye, if the ſurgeon wiſhes to do it in the uſual way with the knife commonly employed, he muſt uſe his left hand; but as few practitioners are able to perform this nice operation with the left hand with ſufficient ſteadineſs, I have delineated a knife, fig. 2. Plate XVI. by which it may be eaſily done with the right hand, while the patient and ſurgeon are ſitting oppoſite to each other in the manner I have mentioned: only, in this caſe, the point of the knife muſt be entered at the internal canthus of the eye, and muſt then be puſhed out to the oppoſite ſide, inſtead of being introduced at the external angle, and carried towards the noſe.

The

The operation being finiſhed, the eye ſhould be immediately covered with a compreſs of ſoft lint, or old linen, ſoaked in a weak ſaturnine ſolution, to be retained by the bandage, fig. 3. Plate XXIX. or any other that does not compreſs the head much, or keep it too warm. For ſeveral days after the operation, no light ſhould be admitted to the patient's apartment. A very low diet ſhould be adviſed: And the eye being very apt to inflame, repeated blood-lettings are frequently requiſite from the jugular vein or temporal artery.

As this operation indeed is more apt to fail by the ſubſequent inflammation of the eye than from any other cauſe, it requires our utmoſt attention to guard againſt it: And as the healing of the inciſion depends in a great meaſure on the eye being kept at reſt, every cauſe of irritation ſhould be avoided. When the operation ſucceeds, the inciſion is in general cured in fourteen or fifteen days; but in ſome inſtances it continues open for ſeveral weeks.

In

In deſcribing the operation, I have noticed an occurrence that is apt to happen, when every part of it is not done with caution, and which commonly proves very alarming; namely, the loſs of a conſiderable part, or perhaps the whole, of the vitreous humour. By this the eye becomes flat, and inſtantly ſinks within the orbit: But although it ought to be guarded againſt with the niceſt attention, it does not always prevent the ſucceſs of the operation. I have known indeed ſome inſtances of the eye remaining ſunk and uſeleſs after this accident, but moſt frequently the globe begins ſoon to fill again, and in the courſe of two or three weeks it has commonly acquired its uſual bulk.

Whether this takes place from a regeneration of the vitreous humour, or merely from the ball of the eye being all filled with an aqueous ſecretion, I will not pretend to ſay. The latter is the common opinion; but why may not the vitreous humour be renewed as readily as the other? I am inclined to think that a renewal of the

the one happens as readily as that of the other, from having often obſerved as perfect a ſtate of viſion after this operation, where all the vitreous humour had been loſt, as if none of it had been diſcharged; of which a remarkable inſtance occurred in a woman who ſome time ago had the operation performed upon both eyes. The eyes were otherwiſe both apparently ſound: In one, the whole of the vitreous humour was forced out along with the cataract, and the eye ſunk entirely to the bottom of the orbit; in the other, the operation was performed with much accuracy; the cataract was extracted, and none of the vitreous humour eſcaped. In the courſe of three or four weeks, however, from the operation, both eyes were of the ſame bulk; their appearance was perfectly ſimilar, and the patient diſcovered objects equally well with each of them. This does not indeed determine the point with certainty, as it may be alleged, that the figure of the eye being preſerved by the aqueous humour, the effect produced upon

viſion by the loſs of the vitreous humour cannot probably be great; but we can ſcarcely ſuppoſe that any part of ſuch an important organ has been formed in vain.

I ſhall now offer a few obſervations on the inſtruments employed in this operation. Knives of various forms have been propoſed for it; but thoſe delineated in Plate XVI. have been moſt generally uſed; and of theſe fig. 1. and 3. are the beſt: The firſt I have uſed ſucceſsfully in various inſtances; and the latter, which I now believe to be the beſt that has yet been propoſed, is the knife of the ingenious Dr Richter of Gottingen. The ſhape of the firſt is nearly that of a ſpear-pointed lancet; only the back of it is blunt, excepting a fourth part of an inch or thereby near the point, which ſhould be ſharp on both edges; and that ſide of the knife which paſſes next the iris ſhould be ſomewhat round, while the other is nearly or altogether flat. By this we prevent, as much as poſſible, any riſk of hurting the iris,

iris, which is apt to happen with a knife that is flat on both ſides, and with both edges ſharp through its whole length. The operation has frequently indeed been performed with this kind of knife, but it is done with more ſafety with the one I have mentioned. We ought however to take care, that while a knife for this purpoſe ſhould be extremely ſharp and finely poliſhed, it ought likewiſe to be firm; for the cornea being both thick and firm, it is more difficult to pierce than thoſe who are not accuſtomed to this operation are apt to imagine, and who are therefore diſappointed at finding the inſtrument in ordinary uſe too fine. It ſhould be at leaſt as firm as a common lancet.

For the purpoſe of opening the capſule of the lens, nothing anſwers better than the flat curved probe delineated in Plate XVIII. fig. 5. The inſtrument commonly uſed for this is repreſented in Plate XXIV. fig. 2., but we incur with it a greater hazard of hurting the iris. But whatever inſtrument is employed, it ſhould be paſſed

through the pupil with much ſteadineſs, otherwiſe the iris may be readily injured, of whatever form it may be.

I have thus deſcribed all the ſteps of the operation as it is now practiſed, with ſuch improvements as it appears to admit of: But as it is an operation of much importance, and liable to different objections, even in its preſent improved ſtate, I have been led to conſider it with more than ordinary attention, and to make experiments upon different animals with a view to obviate theſe; the reſult of which I ſhall now ſhortly relate, although I did not think it proper either to place any weight on them, or even to mention them in the deſcription of the operation; for, till confirmed by experience upon the human body, no conjecture, however well founded it may appear to be from experiments on other animals, ſhould be allowed to have much influence on our opinion.

The moſt material objections that occur to this operation are theſe:—The vitreous humour

humour is apt to paſs ſuddenly off along with the cataract; by which the eye is in ſome inſtances ſunk ſo much as never to recover its form again:—The inciſion being made in the tranſparent part of the eye, the cicatrix which enſues is frequently ſo extenſive as to obſtruct the rays of light in their paſſage to the retina; by which viſion is often as effectually obſcured, as if the cataract had not been extracted:—And laſtly, the lens being often too large for paſſing through the pupil, the iris is frequently much injured by this part of the operation, when in every other reſpect it is perhaps very properly performed.

In regard to the firſt of theſe, it may be alleged, that it does not occur when the operation is properly done; and that it cannot with propriety be ſtated as an objection, merely becauſe it frequently happens from awkwardneſs or inattention in the operator. It is, however, ſo frequent, that whatever can tend to prevent it, muſt

be conſidered as a very material improvement.

This, I think, may be in ſome meaſure done, by the inciſion being made in a different part of the cornea. When the opening in the cornea is made, as in the uſual way of performing this operation, in the moſt depending part of it, all the aqueous humour is inſtantly diſcharged, by which the vitreous humour is deprived of ſupport at its anterior ſurface; ſo that any preſſure made upon the ball of the eye by the ſpeculum, or even by the natural action of the muſcles of the eye, is very apt to force it out. Inſtead of this, by making the cut in the upper part of the cornea, the lens may be extracted with equal eaſe, while a conſiderable part of the aqueous humour being ſtill retained by the inferior half of the cornea remaining entire, the vitreous humour is neither ſo ſuddenly nor ſo entirely deprived of the ſupport which it affords, and does not eſcape ſo readily as in the ordinary method of performing the operation. At leaſt, this I have

have found to happen in other animals; and there is reaſon to imagine that it will likewiſe be the caſe when the operation is done on the human eye.

It is alſo probable, that another advantage may be derived from the inciſion being made in the upper part of the cornea. One material objection to this operation, when done in the uſual way, ariſes, as I have already obſerved, from the cicatrix induced by the inciſion on the cornea. The ſame extent of the cornea will no doubt be cut, when the operation is performed in the manner I have mentioned; but the cicatrix being in the upper part of the eye, it will not probably prove ſo hurtful, as it is of moſt importance for objects to be ſeen diſtinctly that lie beneath the eye. We frequently find that patients who have undergone this operation, ſee every object more diſtinctly, when placed above the eye, than when viewed beneath it; a circumſtance that cannot in any other manner be ſo well explained.

The upper part of the cornea is cut with the ſame eaſe as the under part of it; the ſame inſtruments being employed, and the ſurgeon, patient, and aſſiſtants, being placed in the ſame manner: Only in this caſe the knife muſt be introduced with the cutting edge of it towards the upper part of the eye, the inciſion being to be extended in this direction: And as the under half of the cornea remains undivided, the lens, on paſſing through the pupil, being apt to be retained by the flap, muſt be cautiouſly removed, either with the ſcoop, Plate XVI. fig. 4.; with a ſmall ſharp hook, Plate XVIII. fig. 2., or with the ſmall forceps, fig. 4., which were made for this purpoſe when I was engaged in the experiments that I have mentioned.

In this manner the two firſt objections to this operation are in ſome meaſure removed; and from all the obſervations that I was able to make of it in the courſe of the experiments to which I allude, I think it probable that it will anſwer in every reſpect better than any other that has yet been

been propoſed; but as I have never put it in practice in the human eye, I cannot ſpeak of it with deciſion; and I propoſe it only as a hint for future obſervation.

But although we may by this means prevent the eſcape of the vitreous humour, and may in ſome meaſure avoid the bad effects that uſually reſult from the cicatrix after this operation, yet the third objection remains in equal force againſt it; the cataract muſt neceſſarily paſs through the pupil, and in doing ſo the iris is often irreparably hurt.

As this renders the operation much more hazardous than it otherwiſe would be, it has always appeared to me that it would be a very important improvement of this operation, to extract the cataract in any other manner that would not expoſe the iris to this hazard. This we may do by opening the eye behind the iris, inſtead of making the inciſion in the uſual place in the lucid cornea; and it would be attended with this advantage, that no inconvenience would enſue from the cicatrix.

In

In this manner I have frequently performed the operation on other animals; but it has never, ſo far as I know, been put in practice on the human eye. The objections which occur to it are, that the opening being made in the ſclerotica, the inflammation induced by it muſt probably be great; and this coat of the eye being thicker than the tranſparent cornea, wounds made in it are commonly ſuppoſed to be more difficult to heal. In ſome experiments, however, which I made upon rabbits, with a view to determine this point, no reaſon appeared for this concluſion. The inflammation induced by an opening made in the ſclerotica was not more conſiderable; nor was the cure in any reſpect more difficult than when the operation was done in the uſual manner.

If the operation is ever performed in this manner, the opening ſhould be made in the upper part of the eye, by entering the point of the knife about the tenth part of an inch or thereby behind the tranſparent

tranſparent cornea; and the inciſion being made of a ſufficient ſize for allowing the cataract to paſs, the ſharp hook, fig. 2. Plate XVIII. ſhould be introduced, with a view to extract it. As the point of the inſtrument is extremely ſharp and fine, it penetrates the lens with eaſe, and in this manner it may be removed without making any preſſure on the eye.

Having thus finiſhed the conſideration of the two operations of couching and extracting the cataract, before concluding the ſubject, I ſhall offer a few obſervations on the comparative advantages that reſult from them; and ſhall, at the ſame time, mention thoſe reaſons by which I have been induced to prefer the one to the other.

§ 4.

§ 4. *Comparative View of the reſpective Advantages and Diſadvantages of the Operations of Couching, and extracting the Cataract.*

THE operation of couching, or depreſſing the lens, was the firſt that was practiſed for the cure of the cataract. The extraction of the lens was afterwards propoſed, as a more certain means of removing the diſeaſe. Both methods have had their abettors, and much has been ſaid in favour of each. To appreciate, therefore, the merits of theſe operations, and to aſcertain that by which our intention may be accompliſhed in the ſafeſt and eaſieſt manner, are objects meriting particular attention.

It has been objected to the operation of couching, 1. That it frequently fails from the cataract riſing again into its uſual ſituation. 2. That it muſt always fail when the lens is in a ſoft or liquid ſtate, by the fluid

fluid contained in the capſule diſperſing through the eye when the capſule is opened by the couching needle. And, laſtly, When the opacity lies in the capſule, and not in the lens, that it cannot be cured by couching.

With regard to the firſt of theſe, it muſt be acknowledged, that the cataract frequently riſes again after having been depreſſed to the bottom of the eye: But when the lens, inſtead of being puſhed down immediately behind the iris, is carried, as I have directed, by the point of the needle towards one angle of the eye, and lodged partly beneath the vitreous humour, it never riſes again; and even where the operation fails through the fault of the ſurgeon, or from any other cauſe, the pain attending it is ſo inconſiderable, that few patients will refuſe to have it repeated once or oftener; and I have ſeldom known it fail, where this has been done.

The ſecond objection may appear of more importance to thoſe who are not accuſtomed to this operation, but it is not ſo

in reality. A cataract in a fluid ſtate, and ſpreading over the eye immediately on the capſule being pierced with the needle, is not a common occurrence; from my own obſervation I would ſay, that it does not happen more than once in twenty times: But were we even to meet with it more frequently, ſo far from ſtating it as an objection to the operation, we ſhould rather conſider it as an advantage. In this caſe the violence done to the eye is not ſo great as when the operation of couching becomes neceſſary in all its parts from the cataract being of a firm conſiſtence; a repetition of the operation can never be requiſite; and the milky whiteneſs communicated to the aqueous humour by the diſperſion of the liquid cryſtalline through it, commonly diſappears in a ſhort time after the operation. At leaſt that it commonly does ſo, is conſiſtent with my own experience; and the obſervation is confirmed by the teſtimony of others, particularly by that of the late Mr Pott, on whoſe authority we may rely with confidence.

Nay,

Nay, further, even when the cataract is firm and entire, if completely ſeparated from its capſule by the couching-needle, it almoſt always diſſolves in the aqueous humour, without leaving any veſtige of opacity; an obſervation much in favour of the operation of couching, as it obviates the objection founded on the riſing of the cataract after it has been depreſſed: It ſhews, at the ſame time, that there is little or perhaps no reaſon for ever putting in practice the propoſal of Mr Petit, for removing a cataract which in couching may have been accidentally puſhed into the anterior chamber of the eye, as time will, in moſt inſtances, accompliſh without pain or hazard what cannot be done by Mr Petit's method but at the expence of both.

The lens appears to diſſolve in the aqueous humour ſooner or later, according as it is more or leſs firm when ſeparated from its capſule. The opacity produced by the diſperſion of a fluid lens in the aqueous humour, commonly diſappears ſoon after the operation: Cataracts of a firmer conſiſtence

ſiſtence are ſeldom altogether diſſolved in leſs than ſeveral weeks; in many a ſmall portion of a depreſſed cataract is obſerved in an undiſſolved ſtate a good many months after the operation, and in a few after ſeveral years have elapſed; but this is a rare occurrence.

The third objection, of which I took notice, the alleged impoſſibility of removing the diſeaſe by couching when the cauſe of the opacity lies in the capſule, and not in the lens, ſeems à priori to be the moſt concluſive againſt this operation; but it will not on examination be found to be ſo. In the firſt place, this variety of cataract is rarely met with: It occurs occaſionally, but by no means ſo frequently as to lead us to prefer one mode of operating to another for this reaſon alone.

Secondly, I have already obſerved, that this variety of cataract cannot be cured even by extraction. The opaque capſule may indeed be forcibly torn away with inſtruments paſſed through the pupil, but not

not without doing ſuch violence to the eye, as muſt in a great proportion of caſes, probably in every inſtance, be productive of certain blindneſs. I may therefore, without heſitation, predict, that although this operation may be performed from time to time by thoſe who are fond of innovation, and who wiſh to ſhew their dexterity at the expence of thoſe intruſted to their care, that it will never be generally practiſed. I have ſeen it done by ſome of our moſt expert oculiſts, but in every inſtance the eye was completely deſtroyed by it, while the inflammation which it ſerved to excite never failed to prove uncommonly ſevere.

Beſides, although I will not ſay that this variety of cataract can in every inſtance be removed by couching, yet an attempt towards it may be made with perfect ſafety, by endeavouring to ſeparate and depreſs the capſule with the point of the needle. If this can be done, the operation will prove as ſucceſsful as if no ſuch cauſe of diſeaſe had ſubſiſted: And when

it happens to fail, provided the trial is made with caution, no detriment will enſue.

Beſides theſe objections, it has been ſaid, in oppoſition to the operation of couching, that the pain and inflammation that attend it, are frequently greater than what ariſe from extraction; and that the vitreous humour is more apt to be deranged by the needle in couching, than by the other method of operating.

But neither of theſe aſſertions will be admitted by thoſe who have had ſufficient opportunities of putting both operations in practice. They know, that in general the ſymptoms of pain and inflammation ariſing from the extraction of the cataract are more conſiderable than thoſe that proceed from couching; and it muſt be acknowledged by all who ſpeak impartially, that the operation of extraction is more frequently attended with the loſs of ſome part, or perhaps of the whole of the vitreous humour, than that of couching can in any material degree tend to derange it.

We

We have thus ſeen, that the ſeveral objections ſtated to the operation of couching, are not well founded:—That the cataract can be removed by it as effectually as by the operation of extraction:—That it is attended with leſs pain, and leſs ſubſequent inflammation; while at the ſame time, it never can occaſion thoſe deformities that ariſe from a large cicatrix on the cornea, or from the ſinking of the eyeball, which ſometimes occurs from the loſs of the vitreous humour.

But theſe circumſtances alone ſhould not be allowed to decide a queſtion of ſuch importance: The ultimate and permanent effects of the two operations ought alone to have weight on our opinion. Now, from much obſervation, it appears clearly to me, that the operation of couching proves upon the whole more ſucceſsful than the other; that is, viſion is as perfectly reſtored by couching, and, cæteris paribus, a greater proportion of thoſe who ſubmit to it receive benefit from it, than

of thoſe who undergo the operation of extraction.

With thoſe who have not had frequent opportunities of obſerving the conſequences of extraction, it proves always a very deceiving operation. The removal of the cataract is in moſt inſtances attended with an immediate return of viſion, much to the ſatisfaction of both the patient and operator; but, in a great proportion of caſes, even of thoſe which at firſt have every appearance of proving ſucceſsful, although viſion may be tolerably perfect for ſome time, perhaps for ſeveral weeks, or even for months; yet it generally grows more indiſtinct, till at laſt the patients become altogether blind. This is the reſult of my obſervation; and it correſponds with the event of the operation when performed by various good operators.

The late Dr Young of this place, who practiſed ſurgery for a conſiderable time with much reputation, had at one period a very high opinion of this operation. In the

the ſecond volume of the Edinburgh Phyſical Eſſays, he gave an account of his ſucceſs in ſix caſes in which he had operated a few months before, and which, at the time of writing the paper, appeared to be remarkably great: But in a converſation with the Doctor on this ſubject a good many years afterwards, I found his opinion much changed. The Doctor's obſervations on the conſequences of extraction were exactly ſimilar to thoſe that I had made on it. In the greater number of patients upon whom he had operated, viſion was reſtored immediately on the removal of the cataract; but in nearly the whole of them the ſight began to be impaired in a few months from the operation, and became gradually worſe, till total blindneſs at laſt was produced.

The progreſs of the loſs of that degree of viſion which is reſtored by the extraction of the cataract, is marked by the following appearances. Some degree of immobility is at firſt obſerved in the pupil: —It remains inactive when the eye is ex-

poſed to light:—It gradually becomes ſmaller; and at laſt it is found to be ſo much contracted, as ſcarcely to appear capable of admitting a crow's quill:—It now remains immoveable to whatever light it may be expoſed, and the patient is often reduced to a worſe ſtate than he was in before the operation, being even incapable of diſtinguiſhing light from darkneſs.

This unfavourable event appears to proceed from the violence, which, in the courſe of the operation, is done to the iris; which is well known to be a membrane of the moſt delicate texture; and as the pupil through which the cataract is forced is never ſufficiently large for admitting the lens to paſs with eaſe, it accordingly is ſeldom extracted but with injury to this very nice and uſeful part of the eye.

It may be ſaid, that the violence thus done to the iris ſhould produce an immediate effect; and that viſion, if not hurt by it at firſt, ſhould not afterwards be affected.

fected. In various caſes, the iris is torn in different places, and appears to be irregular in its contraction and dilatation from the time of the operation being performed: But although in theſe, as well as in other inſtances where the pupil is only overſtretched, blindneſs does not take place immediately; yet it is almoſt as certainly to follow, as if it had been inſtantly produced. The reaſon of this it is perhaps impoſſible to explain; but, in the courſe of my obſervation, the fact has been exactly what I have mentioned.

Proceeding upon the idea of the failure of this operation depending in a great meaſure upon the injury done to the iris by the paſſage of the cataract, and being anxious to improve an operation for which at one time I had a great partiality, I have offered a propoſal for this purpoſe.——By making the opening in the eye behind the iris, in the manner I have propoſed, this inconvenience may be avoided; but whether this mode of operating will be found

to ſucceed or not, future experience alone muſt determine.

In the mean time, till the operation of extraction is ſo far improved as to obviate the bad effects that I have pointed out, the method of cure by depreſſion I ſhall continue to prefer, as being more eaſily performed; leſs apt to injure the other parts of the eye; and in moſt inſtances productive of more real advantage.

SEC-

SECTION XVIII.

Of the FISTULA LACHRYMALIS.

A SINUOUS ulcer, with hard or callous edges, is in general termed a Fiſtula; but authors, in treating of diſeaſes of the lachrymal paſſages, have affixed a different meaning to this term: Every obſtruction to the paſſage of the tears from the eye to the noſe, is commonly, though improperly, denominated a Fiſtula Lachrymalis. A ſinus in theſe parts, attended with calloſity, ought alone to receive this appellation; but as ſome confuſion might ariſe from any innovation that could be propoſed, I ſhall avoid, as I have hitherto done, any attempt towards it; and ſhall endeavour to deſcribe, as clearly as poſſible, the various appearances which the diſeaſe in its different ſtages is

known to aſſume, under the general denomination of Fiſtula Lachrymalis.

An anatomical deſcription of the eye having already been given in the ſecond Section of this Chapter, I ſhall now refer to what was then ſaid of the parts concerned in the diſeaſe that we are now to conſider. An accurate delineation is likewiſe given of theſe parts in Plate XII. fig. 1. *b* repreſents the puncta of the two lachrymal ducts, by which the tears are carried from the eye to the ſac *e*; from whence they are tranſmitted by a canal which paſſes in an oblique direction through the os unguis into the noſe, where it terminates below the os ſpongioſum inferius. I formerly remarked, that the os unguis is divided longitudinally by a kind of ridge, which at this part forms the boundary of the orbit; and it is neceſſary to obſerve, that the groove in this bone, through which the naſal duct of the lachrymal ſac runs, lies altogether exterior to the orbit, being ſeparated from it by this ridge of the os unguis.

This ſhort recapitulation of the anatomy of the lachrymal paſſages, will render the deſcription now to be given of the diſeaſes to which they are liable more intelligible.

The fiſtula lachrymalis ariſes, as I have already obſerved, from obſtruction to the paſſage of the tears into the noſe; but the diſeaſe aſſumes a variety of appearances, according to the ſeat of the obſtruction, and to the effects which it excites on the neighbouring parts. Thus we may readily ſuppoſe, that the ſymptoms produced by obſtruction in the puncta lachrymalia, or in the ducts leading from theſe to the ſac, will be widely different from thoſe which ariſe from obſtruction in the lachrymal ſac itſelf, or in the duct leading from this ſac to the noſe. And again, we might, à priori, conclude, that the appearances induced by a recent obſtruction of any of theſe paſſages, muſt probably be very different from thoſe which take place after a long continuation of the diſeaſe.

The

The lachrymal puncta and ducts are apt to be obſtructed by burns, wounds, or whatever excites inflammation in any part of them, and when the tears are thus prevented from paſſing into the noſe, they neceſſarily fall over the cheek, and where they do not become acrid, ſo as to excoriate or fret the neighbouring parts, this diſcharge of tears is almoſt the only ſymptom which this variety of the diſeaſe ever excites: A dryneſs indeed takes place in the correſponding noſtril, by the want of this ſecretion, which uſed to be poured into it; but this inconvenience is never of much importance.

It is this variety of the diſeaſe only which ought to be termed Epiphora, or a watery or weeping eye; for when the obſtruction is ſeated in any other part of the lachrymal paſſages, the diſeaſe that enſues is attended with very different ſymptoms.

When the lachrymal puncta and ducts remain open, if obſtruction takes place either in the under part of the lachrymal ſac,

ſac, or in the duct that leads from it to the noſe, the firſt warning that the patient receives of it is a ſmall tumor that forms in the internal canthus of the eye, that diſappears on being compreſſed, by a plentiful flow of tears paſſing into the eye, and from thence over the cheek. In this incipient ſtate of the diſeaſe, ſome portion of the tears frequently paſſes into the noſe on the ſac being compreſſed; a circumſtance always to be conſidered as favourable, as it ſhows that the obſtruction is not altogether complete.

If the tears are regularly preſſed out before the tumor becomes large, and before they have remained in the ſac ſo long as to become acrid, they are uſually clear, and of a natural appearance when forced out from the puncta; and, from the reſemblance which this fluid bears to the contents of hydropic collections in other parts of the body, this ſtage of the diſeaſe has been termed a Dropſy of the Lachrymal Sac; a diſtinction, however, of no real importance.

When

When in this ſtate of the obſtruction the patient is attentive to a proper and frequent application of preſſure, and does not allow the lachrymal ſac to be over-diſtended, a complete cure may either be obtained, or the diſeaſe prevented from giving much uneaſineſs; at leaſt this is always the caſe ſo long as the tears retain their natural appearance, and while a conſiderable proportion of the contents of the tumor can be preſſed into the noſe.

It moſt frequently happens, however, from the patient being inattentive to the ſtate of the ſac, and allowing it to be over-diſtended, that this moſt ſimple ſtate of the diſeaſe proceeds in a gradual manner to turn worſe:—The paſſage into the noſe becomes completely obſtructed:—The ſwelling in the corner of the eye acquires a greater bulk, but ſtill retains the natural appearance of the ſkin:—The tears are now with difficulty preſſed out, and are obſerved not to be tranſparent, but mixed with a proportion of a thick, opaque, whey-coloured mucus, ſomewhat

ſimilar

ſimilar to, but when minutely examined found to differ conſiderably from, purulent matter.

Even in this ſtage of the diſeaſe the patient ſeldom ſuffers much pain, or any farther inconvenience than that which reſults from the flowing of the tears and mucus over the cheek: at laſt, however, the tumor begins to inflame, to become tenſe, red, and painful to the touch; and the matter preſſed out from it has now a more purulent appearance.

At this period the tumor is exactly ſimilar to a common boil or abſceſs; and by thoſe not verſant in this branch of practice, it is frequently conſidered as ſuch. It becomes gradually more inflamed and more tenſe, till the teguments at laſt burſt, and form an opening in the moſt prominent part of it, at which the tears and matter contained in it are now altogether diſcharged.

When the opening thus formed is ſmall, it commonly heals in the courſe of a few days; but it burſts again as ſoon as any conſiderable

conſiderable quantity of tears and mucus is collected; and continues thus to collect and burſt alternately, till the opening becomes ſufficiently large to prevent any farther collection from taking place.

This ſtate of the diſeaſe exhibits exactly the appearances of a ſinuous ulcer, with callous, and ſometimes with retorted, edges, conſtituting what is properly termed the Fiſtula Lachrymalis. Tears, mucus, and purulent matter, are now abundantly diſcharged from the ſore. When the bone beneath is ſound, this diſcharge is ſeldom either acrid or offenſive to the ſmell; for the opening being in general in the under part of the tumor, the matter is diſcharged almoſt as ſpeedily as it is formed; but when any of the contiguous bones are carious, they are not only found to be ſo by the introduction of a probe, but by the appearance, ſmell, and effects of the matter upon the neighbouring parts. In this caſe, it is thin, fetid, and commonly ſo acrid as to fret and corrode the teguments moſt contiguous to the ulcer:

And

And when the diſeaſe is connected either with ſcrofula or lues venerea, an occurrence by no means unfrequent, the diſcharge and appearances of the ſore are different according as it happens to be combined with one or other of theſe diſeaſes.

I have thus deſcribed the different ſymptoms of this diſeaſe, and the progreſs which it uſually makes from the firſt formation of obſtruction in the lachrymal paſſages, to its laſt or ultimate ſtage; and it is highly neceſſary that practitioners ſhould be acquainted with the different appearances which the various ſtates of it afford; for the method of cure beſt ſuited to one period of the diſeaſe, is frequently unfit for, and indeed altogether inadmiſſible in, others.

From the hiſtory that I have given of the riſe and progreſs of this diſeaſe, it is evident, that in every inſtance it originates from obſtruction in ſome part of the lachrymal paſſages: The cure muſt therefore depend upon the removal of this obſtruction; but the means of effecting this

will vary according to the nature of the cauſe by which it is produced, and to the particular ſtage of the affection, as well as of the part in which it is ſeated: Our prognoſis muſt likewiſe be directed by attention to theſe points; for we may readily conceive, that a cure will be more eaſily and more certainly obtained in the caſe of a recent obſtruction, where the bones are yet perfectly ſound, and where there is no ſuſpicion either of ſcrofula or lues venerea, than in oppoſite circumſtances. When the obſtruction is induced by the venereal diſeaſe or by ſcrofula, and eſpecially when the os unguis and other contiguous bones have become carious, nothing will anſwer the purpoſe till the general taint of the conſtitution is removed; and even then a weeping eye or a frequent flow of tears over the cheek very commonly enſues, and can never in future be removed. But when the fiſtula lachrymalis ariſes, as it moſt frequently does, from inflammation of the lachrymal paſſages, induced either by cold, by the meaſles,

meaſles, or any inflammatory affection to which the eyes are liable, if it has not continued ſo long as to hurt the bones beneath, we may in general give a favourable prognoſis: For in ſuch circumſtances, a due perſeverance in the means to be now pointed out, though not always, is yet very commonly attended with an entire removal of the diſeaſe.

Again, when obſtructions are induced in the lachrymal canals by tumors in the contiguous parts, which they ſometimes are, particularly in caſes of polypi in the noſe, where the tumor by preſſing upon the inferior extremity of the naſal duct is apt to produce a ſtoppage to the flow of tears, the prognoſis muſt in a great meaſure depend on the practicability of removing the excreſcence; for till this is accompliſhed, nothing effectual can be done in the treatment of the fiſtula lachrymalis.

The lachrymal ſac and ducts are lined with a mucous membrane, ſimilar to the membrane that lines the noſe; with

which it is connected, and of which indeed it appears to be a continuation. In a healthy ſtate of theſe parts, the naſal duct of the lachrymal ſac will eaſily admit a crow's quill; a ſize perfectly ſufficient for allowing a free paſſage of the tears into the noſe: But when this membrane that lines the duct becomes inflamed, as the fulneſs which this excites muſt diminiſh the diameter of the canal, obſtruction proportioned to the violence of the inflammation muſt neceſſarily enſue.

I particularly mention the naſal duct, as it is in this duct that the obſtruction producing the moſt frequent variety of the diſeaſe is ſeated, owing to its near contiguity to the noſe; by which, in caſes of catarrh, inflammation is apt to be communicated to it from the membrane of the noſe: But obſtruction to the flow of tears into the noſe will juſt as certainly take place from inflammation ſeated in the ducts leading from the eye to the lachrymal ſac; and the principles upon which the

method of cure proceeds muſt be nearly the ſame in both.

When the diſeaſe proceeds from inflammation, we ſhould depend chiefly on ſuch remedies as prove moſt effectual in inflammatory affections of other parts of the body. General and local blood-letting ſhould be preſcribed in quantities proportioned to the ſtrength of the patient, together with laxatives and a low diet; and a ſaturnine ſolution ſhould be applied to the part affected, either in the form of a poultice, or with compreſſes of ſoft linen. In this manner, when the means are timouſly employed, and duly purſued, obſtructions ariſing from this cauſe are frequently removed; but when the parts have been long in an inflamed ſtate before any remedies were uſed, it often happens that a cure cannot afterwards be accompliſhed even by the moſt complete removal of the inflammation: For, as inflamed parts, when kept long in contact, are every where apt to adhere, ſo the ſides of the lachrymal paſſages, when much inflamed, very rea-

dily unite together; by which a very obſtinate variety of the diſeaſe is produced; and which ſhews, in a ſtrong point of view, the propriety of treating every affection of this kind with the utmoſt attention from the beginning: By which we frequently have it in our power to prevent the formation of this obſtruction, and which nothing but a painful operation can afterwards remove.

When the obſtruction is ſeated in the puncta lachrymalia, or in the ducts leading from theſe to the ſac, and when it is found to continue after the inflammation which gave riſe to it is removed, we ſometimes ſucceed in removing it by inſerting a ſmall probe into each punctum, ſo as to paſs it along the courſe of the ducts into the lachrymal ſac. In this manner the opening may be rendered pervious, and be afterwards preſerved by injecting, twice or thrice daily with a ſmall ſyringe, a weak ſolution of alum, ſaccharum ſaturni, or white vitriol; and by keeping at other times ſmall ſilver or leaden probes conſtantly

ſtantly inſerted, till the ſides of the ducts become callous, the tears will thus find a free paſſage to the ſac, by which a cure will be obtained.

This is no doubt a very nice operation; but whoever is verſant in the anatomy of theſe parts, and accurately acquainted with the courſe of the lachrymal ducts, may, in the courſe of a few trials, be eaſily able to perform it. The probes repreſented in Plate XXI. figs. 5. and 6. and the ſyringe and ſmall tubes in Plate XX. figs. 1. 5. and 7. are the inſtruments to be employed for it.

In obſtructions of theſe ducts, it has been likewiſe propoſed to paſs a ſmall cord or ſeton from the puncta through the lachrymal ſac into the noſe, and to allow it to remain till the paſſage becomes callous. But, beſides the difficulty of effecting this, there is much reaſon to think that it would do more harm than good, as the ſmalleſt cord that we could paſs would create much inflammation and pain.

The obſtruction, however, is moſt frequently ſeated in the duct leading from the ſac to the noſe, forming a variety of the diſeaſe that requires a more complex method of treatment. When induced by inflammation, a ſtrict antiphlogiſtic courſe, ſuch as I have mentioned, will frequently remove it; but when this happens to fail, either from the diſeaſe having been improperly treated from the firſt, or from any other cauſe, other means ſhould be employed. I ſhall therefore ſuppoſe, that all ſymptoms of inflammation are removed; but that the naſal duct ſtill remains obſtructed; that it is attended with a ſlight tumefaction in the internal canthus of the eye, along with a frequent flow or diſcharge of tears over the cheek; and that the ſkin covering the tumor ſtill retains its natural appearance.

This is the moſt ſimple ſtage of the diſeaſe. It is neither attended with pain nor with much deformity or inconvenience; and with a moderate ſhare of attention on the part of the patient, the aid of a ſurgi-

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cal operation may be rendered unneceſſary: By compreſſing the lachrymal ſac from time to time with the finger, the contents of it are diſcharged before they become acrid; and although this does not accompliſh a cure, it in general renders the diſeaſe very ſupportable; ſo that in this ſtage of it, ſo far as I can determine from my own experience, nothing further ſhould be attempted. Various means have indeed been propoſed for effecting a complete cure of this ſtage of the diſeaſe, but being all tedious and painful, and not by any means certain, as long as a watery or weeping eye is the only inconvenience that occurs from it, a prudent practitioner will rather adviſe a patient to ſubmit to this, than undergo the pain, confinement, and uncertainty, of a nice operation. As a freſh attack of inflammation would be apt to render the diſeaſe worſe, he will adviſe him to avoid expoſure to cold, and whatever might tend to induce an inflamed ſtate of the eye and neighbouring parts; and, in the mean time, he will deſire him

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to truſt to gentle preſſure alone for obviating any effects that might enſue from the obſtruction.

For the purpoſe of applying preſſure to the lachrymal ſac, various machines have been invented; the moſt convenient form of which is repreſented in Plate XIX. fig. 1. by which any neceſſary degree of compreſſion may be continued with eaſe and without interruption. But, as we are now ſuppoſing that the naſal duct of the lachrymal ſac is completely obſtructed, and that no part of the tears can be forced into the noſe, no benefit can be derived from a continued courſe of preſſure; and as any advantage to be obtained from the practice is found to accrue with equal certainty from the finger being applied from time to time on the courſe of the ſac, I have always, in this ſtage of the diſeaſe, been accuſtomed to depend upon this alone.

The other means that have been recommended for the cure of this ſtage of the fiſtula lachrymalis, are, the introduction

of a probe into the naſal duct of the lachrymal ſac, with a view to remove the obſtruction:—The injecting of water, or any other mild liquid, for the ſame purpoſe:—And, laſtly, it has been propoſed to introduce a quantity of quickſilver into the ſac, through the lachrymal puncta, the weight and fluidity of which being ſuppoſed well fitted for making it paſs through any ordinary degree of obſtruction.

Mr Anel, a French practitioner, was the firſt who brought to perfection the method of introducing a probe, or the point of a ſyringe, into the lachrymal ſac: but although an accurate knowledge of the anatomy of theſe parts may enable any one to perform it in a ſound or pervious ſtate of the lachrymal paſſages, yet in an obſtructed ſtate of the naſal duct it can ſcarcely be done; and, even when effected, it is not found that ſo much benefit is derived from it as at firſt there might be reaſon to expect.

Two modes are propoſed for effecting this operation: In the one, a ſmall probe,

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or tube of a ſyringe, is inſerted at one of the lachrymal puncta; and being inſinuated along the courſe of the correſponding duct, it is in this manner paſſed into the ſac, and from thence we are directed to carry it through the naſal duct into the noſe: Or, when this cannot be fully accompliſhed, we are deſired to force an opening through this duct by an injection thrown in with a ſyringe inſerted at one of the puncta. The ſyringe above mentioned, with the ſmall correſponding tubes, as delineated in Plate XX. is the inſtrument recommended for this purpoſe. By the other mode of doing the operation, a curved probe, or tube, of a larger ſize, ſuch as is delineated in fig. 4. of the ſame Plate, is to be inſinuated into the noſtril of the diſeaſed ſide; and the point of it being paſſed beneath the edge of the os ſpongioſum inferius, it is there to be eaſily moved about till it meets with the termination of the naſal duct of the lachrymal ſac, from whence it is cautiouſly carried forward till it paſſes into the ſac itſelf.

Different objections, however, occur to theſe operations. The puncta lachrymalia are ſo very ſmall, that no probe or ſyringe can be paſſed through them of a ſufficient ſize for removing any obſtruction in the naſal duct. And although a ſyringe of a larger ſize may in a ſtate of health be introduced through the noſtril directly into the naſal duct itſelf, in a diſeaſed ſtate of theſe parts, it can ſeldom or never be done. In obſtructions of this duct, as they very commonly ariſe from inflammation communicated from the membrane of the noſtrils, the diſeaſe often commences in the extremity or termination of the canal; ſo that it is always difficult and often impoſſible to introduce a probe or ſyringe into it; and if the operator is even ſo fortunate as to accompliſh this, it always requires ſome violence to force it into the lachrymal ſac. Hence a good deal of pain is excited, by which the duct and ſac are both apt to become inflamed: ſo that, inſtead of any advantage being

ing derived from the practice, much miſchief is apt to enſue from it.

The propoſal of curing this diſeaſe by injections, is very ingenious; but, for the reaſons I have given, it will ſeldom, I imagine, be of much real utility. We are indeed told, that it will often anſwer in caſes of ſlight obſtruction; and that all the pain and uncertainty of the ordinary means of cure may thus be avoided. But when the obſtruction is completely formed, it is altogether inadmiſſible, from the impoſſibility of introducing a probe; and whenever the ſtoppage of the tears is only partial, there will be much riſk of doing more harm than good, by the irritation, pain, and conſequent inflammation, which the operation never fails to produce. In ſuch circumſtances, the patient ſhould rather ſubmit to any inconvenience ariſing from the diſeaſe, than to uncertain trials of this kind.

For the ſame reaſons that the paſſing of a probe, and of injections, into the lachrymal paſſages, can ſeldom if ever prove uſeful,

uſeful, the introduction of quickſilver into the lachrymal ſac will likewiſe probably fail: Where obſtruction is already formed, it will not be able to remove it; and unleſs obſtruction takes place, no attempt of this kind is indicated. The practice, however, is ingenious; and as it may be done with more eaſe, ſo it is leſs exceptionable than the uſe of probes or injections.

In the early ſtages of the obſtruction, I have frequently paſſed injections from the puncta lachrymalia into the noſe; but although this proved always ſatisfactory at the time, it has not been attended with any real advantage; for although I have now done it in upwards of fifty inſtances, and in many of theſe liquids were daily paſſed along the lachrymal paſſages for ſeveral weeks together, yet in none has the diſeaſe been removed by it.—The liquids that I employ, are warm-water, roſe-water, and weak ſolutions of ſaccharum ſaturni.

I have thus deſcribed the modes of treatment to be adviſed in this the moſt ſimple ſtage of the diſeaſe; but I muſt again obſerve, that as long as a watery or weeping eye, with perhaps a ſlight occaſional tumefaction in the internal canthus, is the only inconvenience that it excites, nothing ſhould be adviſed but the application of moderate preſſure from time to time with the finger.

But whenever the diſeaſe arrives at ſuch a height as to produce either much pain or deformity, a different treatment is required. When the tumor in the angle of the eye becomes large, inflamed, and painful, as the collected matter ſoon turns ſharp and acrid, the contiguous bones are apt to be injured, if the matter is not quickly diſcharged.

In ſuch circumſtances, a perſon not acquainted with the anatomy of the diſeaſed parts, and with the cauſe of the tumor, would be induced to truſt entirely to an opening being made in it ſufficient for diſcharging

charging the matter: For in this ſtate of the diſeaſe, it aſſumes exactly the appearance of a common boil or abſceſs; and therefore this method of treatment might be conſidered as ſufficient. But although ſome temporary advantage might thus be derived from the diſcharge of the matter, as the cauſe of the tumour would not be removed, a permanent cure it is evident would not enſue. We are here ſuppoſing that the diſeaſe originates from obſtruction in the naſal duct leading from the lachrymal ſac. It is clear, therefore, that the ſac only being laid open, will be attended with no further benefit than that of producing an immediate diſcharge of its contents; for while the tears are conveyed into it by the puncta and lachrymal ducts, if they do not find a free paſſage into the noſe, they muſt neceſſarily be either diſcharged by the opening newly formed, or, if this is allowed to heal, they will again collect and produce a tumor ſimilar to the firſt.

In this ſituation, therefore, our views muſt be,—To diſcharge the contents of the ſwelling,—To procure a free exit in future for the tears from the lachrymal ſac into the noſe,—And to prevent the duct from being again obliterated. And this being accompliſhed, the external opening muſt be healed.

While the tumor continues firm, it ought not to be opened, as this would not only excite more pain, but the parts beneath could not be ſo freely examined as they otherwiſe might be. As long, therefore, as the tumor is hard, a warm emollient poultice ſhould be kept applied to it; and as ſoon as it becomes ſoft and compreſſible, it may be opened with freedom. On account of the contiguity of the eye, and of the inſertion of the orbicularis muſcle, to make an inciſion into the lachrymal ſac has in general been conſidered as a nice and hazardous operation, and particular directions have been given, not only for the figure and ſize of the inciſion, but for diſcovering the exact ſite of the ſac.

There

There is no cauſe, however, for anxiety upon this point; for the ſituation of the ſac is always aſcertained with preciſion by the tumor itſelf; which is formed, as I have already obſerved, by tears and mucus collected in the ſac; ſo that any inciſion that diſcharges this collection muſt for certain reach the ſac. Neither does the form of the opening make much difference in the hazard attending the operation. A ſemilunar cut has commonly been recommended; not only with a view to render the opening larger, but in order, as it is ſaid, to avoid with certainty the tendon of the orbicularis muſcle. There is no riſk, however, of this tendon being injured if the inciſion is made where it ought to be, namely, in the moſt prominent and moſt depending part of the tumor; and it is eaſier done with a common lancet than with any other inſtrument. The point of the lancet ſhould be entered at the upper part of the tumor, puſhed freely into the ſac, and carried downwards in a ſtraight direction to the moſt depending part of it. A

few fibres of the orbicularis muſcle which are inſerted into and ſpread over the lachrymal ſac, will indeed be divided by the inciſion; but no inconvenience is found to reſult from this; and a ſtraight cut, ſuch as I have directed, admits of a very free examination of the parts beneath, at the ſame time that it ſerves to evacuate more effectually than any other the tears and mucus which the tumor is found to contain.

An opening being thus formed, the contents of the tumor ſhould be forced out with moderate preſſure; a ſmall doſſil of ſoft lint ſpread with emollient ointment ſhould be inſerted between the lips of the ſore, and a ſlip of moderately adheſive plaſter employed to retain it. As a plentiful diſcharge commonly takes place, it is neceſſary to renew the dreſſings daily; and with a view to preſerve the opening of a ſize ſufficient for admitting of a free examination of the parts beneath, inſtead of a doſſil of lint, a ſmall piece of prepared ſponge may be inſerted into the ſore every

ſecond

ſecond or third day; but as the ſwelling of the ſponge, by the moiſture applied to it, tends to irritate and inflame the contiguous parts, it ſhould previouſly be covered with a ſingle ply of oiled ſoft linen, which does not hinder it to ſwell, at the ſame time that it allows it to be more eaſily withdrawn; for the purpoſe, however, of removing it more readily, a piece of ſtrong waxed thread ſhould be attached to it.

In former times it was the common practice, after opening the tumor, to endeavour to deſtroy the hard edges of the ſore, either with the actual or potential cautery, or with ointments impregnated with red precipitate, and other eſcharotics. By this the patient was made to ſuffer much unneceſſary pain, and more deformity was produced; while the chance of a cure was much leſs than when milder dreſſings are employed. Indeed the only way in which a cure can be effected with this treatment, is the total obliteration of the lachrymal ſac and ducts with which it

is connected. Theſe being either deſtroyed, or made to inflame, their internal ſurfaces might in ſome inſtances adhere together, on preſſure being applied to them. This, however, could not frequently happen; for while the puncta lachrymalia and ducts connected with them remained open, the tears ſtill finding acceſs to the parts beneath, would neceſſarily produce frequent returns of the diſeaſe; and when, by the violence of the inflammation, theſe ducts happened to be obliterated, ſtill the patient would be liable to a conſtant trickling of the tears over the cheek. This idea, therefore, ought never to be kept in view. Inſtead of eſcharotics, the mildeſt dreſſings only ſhould be employed; nor ſhould the doſſils of lint or ſponge that I have adviſed, be of ſuch magnitude as to produce much pain; all that they are expected to perform, being to dilate the lachrymal ſac, by which we may be enabled to ſearch with freedom for the commencement of the duct leading from the ſac to the noſe.

In

In this manner any hardneſs in the edges of the cut will ſoon be removed; and the ſore being ſufficiently cleared of a tough viſcid kind of mucus, ſomewhat reſembling ſloughs, with which, for a few days after the operation, it is always covered, we are now to proceed to the moſt important part of the cure, the ſearching for and forming a free paſſage for the tears from the lachrymal ſac to the noſe.

This part of the operation is effected in different ways: By clearing the natural duct leading from the lachrymal ſac through the groove in the os unguis into the noſe; or when this is found to be impracticable, we form an artificial opening into the noſe directly through the ſubſtance of this bone from the under and back part of the lachrymal ſac.

As unneceſſary violence ſhould always be avoided, we ſhould firſt endeavour, by the eaſieſt method, to diſcover the natural conduit of the tears, and to remove the obſtruction formed in it. For this purpoſe, a firm round-pointed probe, or the curved

inſtrument, Plate XXV. fig. 2. ſhould be inſerted, by the inciſion, into the bottom of the lachrymal ſac; and if the point of it can be paſſed into the commencement of the naſal duct, ſome hope may be entertained of the paſſage being made pervious: Some degree of force may indeed be neceſſary for effecting this; but whenever it can be done, which frequently is the caſe, by the probe being puſhed in a proper direction with moderate preſſure, it ought always to be preferred to every other method of treatment.

The paſſing of the probe into the noſe is the moſt difficult as well as the moſt uncertain part of this operation; for when this is accompliſhed, we have it generally in our power to preſerve the opening, by keeping a piece of bougie, catgut, or lead-wire conſtantly in it, till the paſſage of the duct is rendered ſufficiently clear. But it ſometimes happens, that all our trials for the diſcovery of the naſal duct prove ineffectual. Much force, however, ſhould never be employed; for, as the point of the inſtrument

inſtrument will more readily be puſhed againſt the bone than into the duct, it would be more apt to do harm than good. When it enters the ſuperior part of the canal with eaſe, it may with ſafety, and with ſome probability of ſucceſs, be puſhed forward in the manner I have mentioned; but when the duct is obliterated through its whole courſe, by the ſides of it adhering together, an occurrence, however, which I now believe to be leſs frequent than I once ſuppoſed it to be, it would be highly improper, for the reaſon I have given, to uſe much force in our endeavours to detect it.

When, therefore, all our trials for diſcovering the natural paſſage between the lachrymal ſac and the noſe prove unſucceſsful, as we know that a cure will not be obtained if the tears be not conveyed to the noſe, our views muſt now be ſolely directed to the formation of an eaſy and free artificial opening for this purpoſe.

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In the anatomical deſcription that I premiſed of theſe parts, we have ſeen that the poſterior part of the lachrymal ſac is lodged in and attached to a groove in the os unguis; and as the ſac is ſeparated from the cavity of the correſponding noſtril by this bone only, it is evident that an opening made from the back part of the ſac muſt ſerve to convey the contents of it into the noſe. It is this part of the operation that we are now to conſider.

I have already obſerved, that the actual cautery was formerly employed for deſtroying the hard edges of the ſore, and as it was a prevailing opinion with almoſt all the practitioners of the laſt and preceding centuries, that the fiſtula lachrymalis was almoſt always connected with a carious ſtate of the correſponding bones, the cautery was likewiſe uſed for aſſiſting in the exfoliation of the diſeaſed parts. In conſequence of this, a cure was ſometimes accompliſhed by a remedy that was employed only for the removal of what they conſidered as an accidental occurrence, and

not as a cauſe of the diſeaſe: For the os unguis being extremely thin, a hot iron can ſcarcely be applied to it without deſtroying it entirely; and as this would in ſome inſtances happen, a cure would be ſometimes obtained even where the practitioners who employed the remedy were totally ignorant of the manner in which it acted; for as they were unacquainted with the real cauſe of the diſeaſe, from their ignorance of the anatomy of the parts concerned in it, any cures that they performed muſt have been more the effect of accident than of deſign.

It is not, however, without ſurpriſe, that we find, even in later times, when the cauſe of the diſeaſe is well known, and when the principles of the operation are founded on an exact knowledge of the diſeaſed parts, that the ſame method of treatment has been continued. Till of late, the actual cautery was very commonly employed by the beſt ſurgeons of this country, for perforating the os unguis. Even the celebrated Cheſelden patroniſed this method; and

it

it is ſtill practiſed in ſeveral parts of the Continent.

With all the caution, however, that can be employed, of covering the hot iron with a canula, or wet clothes, it is an uncertain and dangerous practice; for parts muſt be deſtroyed by it, or at leaſt much injured, which ought not to be hurt, as it is impoſſible to convey a red-hot iron to the os unguis, and to deſtroy part of this bone, which alone ought to be perforated, without doing miſchief to the contiguous parts.

The cautery ought therefore to be laid aſide; and this the more readily, as the ſame intention can be accompliſhed with equal certainty, and with more eaſe and ſafety, in a different manner, merely by forcing a firm ſharp inſtrument, of the form and ſize of the common trocar, from the back part of the ſac through the os unguis. A curved inſtrument of this kind has commonly been employed, ſuch as is repreſented in Plate XIX. fig. 5.; but the ſtraight trocar, delineated in the ſame

Plate, fig. 2. anſwers better. With this inſtrument, the opening through the bone may be made, either by twirling it round between the fingers; by moving it forward and backwards with the fingers or palm of the hand; or by puſhing it ſtraight forward; and the ſurrounding parts may be protected, at the ſame time that the inſtrument is more ſteadily fixed than it otherwiſe can be, by paſſing it through a canula, ſuch as is delineated in the ſame Plate, fig. 4.

In proceeding to this part of the operation, the patient's head ſhould be ſupported by an aſſiſtant; and the ſurgeon, ſitting or ſtanding between him and the window, ſhould introduce the canula of the trocar into the opening made in the tumor; and the end of it being carried to the under and back part of the ſac, it ſhould be kept firm in this ſituation with one hand, while the ſtilette is inſerted into it with the other: The point of the ſtilette muſt now be puſhed firmly but ſlowly forward in a proper direction into the

the noſtril, and we know that it has entered that cavity as ſoon as a diſcharge of blood is perceived to take place from it.

In making the perforation, a proper direction to the courſe of the ſtilette is a point of the firſt importance, and therefore merits the greateſt attention. If turned in any degree outward, or inclining towards the eye, it would penetrate the orbit;—poſteriorly, it would paſs into the ethmoid bone;—and if puſhed in a horizontal direction towards the noſe, the os ſpongioſum ſuperius would be injured, while the intention of the operation, that of affording a free paſſage for the tears into the noſe, would be entirely fruſtrated. In order to avoid theſe inconveniencies, the inſtrument ſhould be puſhed on towards the noſe in an oblique direction downwards and inward from the inferior part of the lachrymal ſac. Care ſhould be taken, however, not to endeavour to follow the courſe of the natural paſſage of the tears, as by ſome has been adviſed; for in this manner we would not only

only injure the maxillary bone, but the opening here could not be made ſo free and large as in that part of the os unguis where the lachrymal ſac terminates, and where the commencement of the naſal duct takes place.

On the inſtrument having reached the noſtril, it ſhould be moved with ſome freedom; not by carrying it farther in, as this might injure the parts within the noſe; but by giving it a free rotatory motion, ſo as to render the opening made with it ſufficiently pervious: This being done, the ſtilette ſhould be withdrawn, when a lead probe, fully equal to the ſize of the canula, ſhould be introduced, and then the canula ſhould be taken out. One end of the lead ſhould paſs freely through the opening in the os unguis, and the other muſt project about the eighth part of an inch or thereby paſt the level of the external ſore. With a view to prevent the lead from ſlipping altogether into the noſe, this projecting part of it ſhould be ſomewhat curved after the canula is withdrawn.

withdrawn. The ſore ſhould now be covered with a ſmall pledget of lint ſpread with emollient ointment, and the whole may be retained with a ſlip of adheſive plaſter; for no bandage can be kept on theſe parts but with much inconvenience and diſtreſs.

In this manner the operation is completed; but much attention is neceſſary on the part of the ſurgeon to preſerve the opening, and to prevent it from filling up in future. With this view, the lead-probe muſt be continued for a conſiderable time, in order to render the paſſage as callous as poſſible; care being taken to withdraw it every day or two, for the purpoſe of clearing it and the ſore from any impurities; and at each dreſſing a quantity of infuſion of oak-bark, a ſolution of alum, or any other aſtringent, ſhould be injected with a ſmall ſyringe from the external opening into the noſe. The ſyringe, fig. 1. Plate XX. anſwers this purpoſe properly.

No

No certain period can be fixed, at which we can ſay the paſſage will be ſufficiently callous, and at which the lead-probe may be withdrawn; for this will in ſome meaſure depend on the conſtitution of the patient, as well as on the particular ſtate of the parts themſelves. In ſome inſtances, it may poſſibly be done with ſafety in a ſhorter period; but I have never ventured on taking it away till the eight or ninth week has elapſed, commonly not ſo ſoon. The inconvenience attending it is inconſiderable; and we are to remember, that the ſucceſsful iſſue of the operation is to depend greatly on due attention to this part of it; for if obſtruction ſhould afterwards occur, either from the opening in the bone filling up with callus, or from the ſofter parts adhering together, the patient will ſoon be in the ſame diſeaſed ſtate as before any attempt was made towards a cure.

On withdrawing the lead, the external opening ſhould be cleared from any mucus with which it may be ſtuffed; and as

by this time it will be reduced to a very ſmall ſize, it will ſoon heal merely by laying the ſides of it together, and covering it with a piece of adheſive plaſter: or, when this does not ſucceed in a few days, touching the edges of the ſore with cauſtic will in general complete the cure quickly. In the mean time, moderate preſſure ſhould be applied on the courſe of the lachrymal ſac, either with the finger of the patient frequently placed on it, or by means of the machine, Plate XIX. fig. 1. And this ſhould be continued, till there is reaſon to ſuppoſe that the ſac and contiguous parts have again recovered the tone of which they were deprived by the long continuance of the diſeaſe, as well as by the operation.

What I have ſaid with reſpect to the propriety of continuing the lead-probe for a conſiderable time, and of applying preſſure afterwards on the courſe of the ſac, is equally applicable when the natural paſſage of the tears has been diſcovered, as when an artificial opening is formed in the

manner

manner I have adviſed. Indeed more attention is neceſſary to this point in the one caſe than in the other; for we find by experience, that the diſeaſe is more apt to return when the operation is finiſhed by the tears being carried through the naſal duct, than when an artifical opening is made for them; owing, as I imagine, to a wider and more free paſſage being commonly formed by this laſt method of conducting the operation.

Inſtead of a probe of lead, ſome practitioners employ a piece of catgut or common bougie; but neither of theſe anſwers the purpoſe ſo well. They are more difficult to introduce;—they retain the mucus of the part, and therefore are not ſo cleanly;—they are apt to be entangled by the newly divided bone; and they do not anſwer ſo well for rendering the paſſage callous as the other.

I have thus deſcribed the different ſteps of the operation; and the practice I have adviſed is ſuch as experience has proved to be the moſt ſucceſsful. It muſt indeed be

 acknowledged,

acknowledged, that it does not in every inſtance ſucceed; for caſes frequently occur which render fruitleſs every attempt that can be made for curing them. After performing the operation in the moſt ſatisfactory manner; when the paſſage for the tears has been rendered completely pervious; and even where external preſſure has afterwards been continued in the moſt attentive manner; the diſeaſe is ſometimes found to recur. In ſuch inſtances, however, we conclude, that ſcrofula, or ſome other diſeaſe of the conſtitution, takes place; by which alone, or by the contiguous bones being carious, this operation, when properly performed, can be rendered abortive. It may ſometimes indeed fail by too ſmall an opening being formed in the os unguis; but this is the fault of the operator, and not of the operation. There is no cauſe for timidity on this point: For although it has been alleged that miſchief may enſue from breaking this bone with the trocar, yet daily experience tends to prove the contrary; for

even

even where it has been broken with much freedom, I never knew any inconvenience ariſe from it.

In order to prevent the bad conſequences which thoſe not accuſtomed to this operation have ſuppoſed would occur from the ſplintering of this bone with a trocar, it has been propoſed to take out a piece of it entirely with a ſharp cutting inſtrument, ſuch as is delineated in Plate XVIII. fig. 3.

By applying this inſtrument to the os unguis, in the manner that I have mentioned for the uſe of the trocar, a portion of the bone may be eaſily cut out; but there is no neceſſity for this precaution. The operation is more effectually done with the trocar; and as no danger is found to enſue from it, it ought to be preferred.

In the treatment of this diſeaſe, when it is unfortunately found to return even after the operation has been properly performed, if it appears to ariſe from a carious ſtate of any part of the contiguous bones, a cure may yet be accompliſhed

by laying the tumor again open; by endeavouring to accompliſh an exfoliation of the diſeaſed bone; and by afterwards forming another opening in the os unguis in the manner I have directed, if the opening made by the ſeparation of the exfoliated pieces of bone be not ſufficient. But when a relapſe takes place, without ſome obvious cauſe of this kind, as any opening we might form in the bone would probably be obliterated by a continuance of the ſame diſeaſe of the ſyſtem by which the firſt attempt was rendered fruitleſs, it could anſwer no purpoſe to repeat it, were it not with a view to make trial of a different mode of operating.

A conſiderable time ago it was propoſed by different practitioners, to obviate the uncertainty attending this operation, by introducing a ſmall canula of gold or ſilver, either through the natural paſſage of the os unguis, or through an opening made with a trocar; and by leaving the canula, and healing the ſkin over it, thus to form a paſſage on which no diſeaſe of the conſtitution

ſtitution could have any effect. By thoſe who conſider the uſual operation for the fiſtula lachrymalis as very uncertain, it has been propoſed to employ a canula of this kind in every caſe; but as this operation, when properly performed, proves frequently very ſucceſsful, and as patients uſually conſider it as a ſevere meaſure to have an extraneous body left in a wound with a view to remain, it may be proper not to adviſe it in any caſe, till on trial we have found that the other will not ſucceed. In every caſe, however, where the uſual operation has failed, the method of cure by a canula ought to be tried; and when properly performed, it will very commonly ſucceed. Tubes for this purpoſe ſhould all be of gold, as being leſs apt to be injured by the fluids of the part in which they are left than any other metal; and much care ſhould be taken to have the canula well poliſhed, and as exactly fitted as poſſible to the parts in which it is placed. When properly fitted, it gives little pain, even from the time of being introduced,

and at laſt it frequently ſits with perfect eaſe. In Plates XX. XXV. and XXVI. different forms are delineated of theſe tubes, but of theſe fig. 5. and 6. Plate XXV. as recommended by Mr Pellier, are the beſt. They are of a length that experience has ſhewn to anſwer in the moſt part of adults; and their diameter ſhould be as large as the opening in the bone can admit, with a view to prevent, with as much certainty as poſſible, the tears and mucus that may paſs into them from ſtopping them up.

The proper length of the tube is obviouſly a point of the firſt importance in this operation. For, if too ſhort, it will fail, by the under part of it being apt to be plugged up with the lining membrane of the noſe, and if too long, by the end of the tube being preſſed againſt the ſeptum naſi on the oppoſite ſide of the noſtril. This laſt objection appears to apply to the tubes of Mr Wathen, which, in one caſe in which they were tried here by my friend Dr Wardrop and me, proved unſucceſsful, chiefly

chiefly from this cauſe; and as Mr Pellier's tubes, which are conſiderably ſhorter than Mr Wathen's, have anſwered in every caſe in which I have known them uſed, I conclude that in this reſpect, as I believe in every other, they are preferable to thoſe of Mr Wathen. As the directions given for the uſe of Mr Pellier's tubes in the next ſection, are ſufficiently full, I ſhall now refer to them; and directions for thoſe of Mr Wathen will be ſeen in the explanation of Plate XXVI. in which the tubes that he recommends are delineated.

In deſcribing the progreſs of the diſeaſe, I had occaſion to obſerve that the tumor in the corner of the eye, when it inflames and ſuppurates, proceeds at laſt to a ſtate of ulceration. This circumſtance, however, does not point out any difference in the method of cure; only in this caſe, inſtead of uſing a lancet for laying the ſac more freely open, a cut ſhould be made with a ſcalpel upon a director introduced at the ulcer. In every other point, the

cure

cure is to be managed as I have already adviſed, by rendering the natural paſſage of the tears pervious when this is found to be practicable; and, when this cannot be done, by making an artificial opening through the os unguis.

When, again, the os unguis and other contiguous bones are found to be carious, the ſores ſhould be preſerved open till the diſeaſed parts are all removed; when, if a large enough opening is not formed for the paſſage of the tears, by the pieces of bone which have been taken away, it may now be made, and all the other ſteps of the operation completed in the manner I have already pointed out. In local affections of theſe bones, a cure may thus be in ſome inſtances accompliſhed; but where the caries depends upon a venereal taint, as is not unfrequently the caſe, although a well conducted courſe of mercury may cure the general diſeaſe of the conſtitution, it is ſeldom able to prevent very extenſive exfoliations of the diſeaſed bones; by which, the natural paſſage of the tears being

being deſtroyed, and the bones through which they ſhould be conveyed being perhaps altogether removed, they muſt in future paſs entirely over the cheek; for in ſuch circumſtances art can afford no relief.

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SECTION XIX.

Additional Remarks on Diſeaſes of the Eyes.

IN the preceding ſections of this chapter, the diſeaſes of the eyes were ſo fully treated of, that it was not my intention to ſay any thing further upon them: But a foreign oculiſt, M. Jean François Pellier, having appeared in this country, where he deſervedly acquired much reputation, I judged it proper in the former editions of this work, to communicate ſuch parts of Mr Pellier's practice as appeared to be of importance. Poſſeſſing the advantages of a liberal education, a ſound judgment, and much experience, Mr Pellier has been enabled to ſuggeſt improvements in the treatment of almoſt every diſeaſe to which the eyes are liable; and an uncommon degree of

of ſteadineſs, conjoined to a quick eye-ſight, give him a command of himſelf, and a facility of operating, not often attained. I think it proper likewiſe to remark, that Mr Pellier communicated to me his knowledge of the diſeaſes of the eyes in the moſt candid manner; which puts it in my power to lay his obſervations before the Public, he having given me permiſſion to do ſo.

While, by giving an early account of material improvements, I thus acquit myſelf of an obligation to the Public, I at the ſame time embrace, with much ſatisfaction, the opportunity which it affords of announcing the merit of an operator, who, although a ſtranger, and as yet not much known in this country, is perhaps one of the beſt oculiſts now in Europe.

In the firſt place, I ſhall mention what I have learned of Mr Pellier's practice; and ſhall then offer ſuch remarks as occur to me upon it.

On the ſubject of the cataract his obſervations are particularly valuable. By at-

tentive examination, he can in many inſtances ſay whether a cataract is hard, ſomewhat ſoft, or altogether fluid; and as his method of operating varies according to theſe circumſtances, it is of importance to be able to determine à priori with regard to them. He can alſo aſcertain, whether a cataract is of a large or ſmall ſize; by which he is often directed in the different ſteps of the operation.

I know that theſe are circumſtances which practitioners in general conſider it as impoſſible to judge of with preciſion, particularly with reſpect to the conſiſtence of cataracts; and I muſt acknowledge, that I was clearly of this opinion, till of late that I was convinced of the contrary, not by Mr Pellier's aſſertions alone, but by different proofs of the fact. I aſſiſted Mr Pellier in different caſes where the cataract was extracted: In all of them he previouſly foretold the conſiſtence and ſize of the cataract with perfect confidence; and in every inſtance his prognoſis was preciſe and accurate.

I am credibly informed, too, that this happened with other practitioners in whoſe preſence he operated in different parts of this country.

He diſtinguiſhes ſeveral varieties of cataract, which in practice ought to be kept in view.

The three principal varieties that he mentions are, what he terms the true or curable cataract; the mixed or doubtful kind; and the falſe or incurable.

1. What he terms the curable or true cataract, is known by the pupil retaining its natural power of contracting and dilating in full perfection, while the patient is at the ſame time able to diſtinguiſh the light of a candle, or of any other luminous body, and even certain bright colours, ſuch as red, green, &c.

2. The mixed or doubtful cataract, is attended with a weak feeble contraction and dilatation of the pupil, and the patient can ſcarcely diſtinguiſh light from darkneſs. Along with an opaque ſtate of the lens, this is ſuppoſed to be attended with a diſeaſe of

of the retina, or of ſome other part of the eye.

3. In what he terms the falſe or incurable cataract, along with an opaque ſtate of the lens, there is evidently a diſeaſed ſtate of the pupil, which remains immoveable to whatever degree of light it may be expoſed, at the ſame time that the patient does not diſtinguiſh between the moſt brilliant light and perfect darkneſs.

Cataracts may be either ſimple or compound, or they may be complicated with other affections.

1. A ſimple cataract is a mere opacity of the cryſtalline lens, all the other parts of the eye remaining perfectly ſound.

2. A cataract is ſaid to be of a compound nature, when blindneſs is produced by an opaque ſtate of the body of the lens, of the liquor which ſurrounds it, and of the capſule.

3. The diſeaſe he conſiders as complex, when it is conjoined with other affections of the internal parts of the eye; the moſt frequent of which is amau is.

Cataracts

Cataracts are not unfrequently attended with a diſſolution of the vitreous humour, and ſometimes with an opaque ſtate of it. This variety of the diſeaſe is for the moſt part produced by violent inflammation. It is eaſily diſtinguiſhed by thoſe accuſtomed to an attentive examination of the eye; and it is particularly neceſſary for operators to be well acquainted with it; for no operation, either extraction or depreſſion, ſhould be ever adviſed for it. The operation has never in any inſtance of this kind of cataract been known to ſucceed; and for the moſt part, Mr Pellier obſerves, it is productive of very dreadful pain, and the moſt violent degree of inflammation that he ever met with. In general, too, the pain and inflammation induced in this manner remain fixed and permanent, without yielding in any degree to the uſual remedies.

Cataracts are ſometimes accompanied with an imperforated iris; in which caſe, as no light can paſs to the bottom of the eye, no degree of viſion takes place; and

at other times they are complicated with adheſions, either to the iris, or to the capſule of the vitreous humour. Preternatural adheſions of the lens to the capſule of the vitreous humour can ſcarcely be diſtinguiſhed by the eye; but they take place very commonly where cataracts have been originally produced by, or attended with, much inflammation; and they always render the operations of extraction and couching difficult. It is this kind of adheſion, Mr Pellier imagines, which prevents the operation of couching from ſucceeding ſo frequently as it otherwiſe might do; for when it takes place in any degree, the cataract, he ſuppoſes, will always riſe again on the needle being removed from it.

In forming an opinion of cataracts from the real ſeat of the diſeaſe, different circumſtances require attention.

1. It often happens, as I have already remarked, that the lens only is opaque.—This variety of the diſeaſe is moſt frequent, Mr Pellier obſerves, in adults, and eſpecially in old age.

2. When

2. When the opacity is ſeated in the capſule of the lens, if the anterior part of it only is diſeaſed, it appears to be remarkably white, and to be placed very contiguous to the iris; while, on the contrary, if the poſterior part of it only is opaque, it is commonly of a grey colour, and the opacity appears to be deep ſeated.

It ſometimes happens, both after the operation of extraction and couching, that in the courſe of ten or twelve days, the capſule of the lens, which at firſt was perfectly ſound, becomes quite opaque.—This variety of the diſeaſe Mr Pellier terms the Cataracte Secondaire.

3. When the body of the lens and its capſule are both opaque, the cataract is commonly ſoft or even altogether fluid. In this caſe, much care is required in the operation to prevent the capſule from burſting: A degree of nicety, Mr Pellier obſerves, at which thoſe not much accuſtomed to this branch of practice can ſeldom arrive, but which is very practicable with operators of experience.

4. In ſome inſtances, cataracts appear to proceed from a partial affection of the lens, ſmall opaque ſpots being obſerved in it, while the reſt of it remains ſound. In this caſe, viſion is always moſt perfect in an obſcure light, when the pupil is moſt dilated.

In forming an opinion of the conſiſtence of cataracts, three circumſtances particularly require attention.

1. When a cataract is of a firm conſiſtence, it is in almoſt every inſtance ſomewhat brown; it appears in general directly behind the iris; not ſo deep as the lens is uſually placed; and the pupil dilates and contracts very ſlowly.

2. A fluid or ſoft cataract is not commonly white, but rather of a cream colour, ſomewhat reſembling purulent matter; and for the moſt part in this variety of the diſeaſe, the globe of the eye appears full, and ſomewhat more prominent than it uſually is.

3. It ſometimes happens, Mr Pellier obſerves, that along with this fluid ſtate of a cataract,

cataract, the capſule is much thickened. To this he gives the appellation of the Cyſtic Cataract.

The colour of a cataract is another point of importance.

1. I have juſt obſerved, that a ſoft or fluid cataract is for the moſt part of a cream colour; but in that variety of the diſeaſe ſometimes met with in children at birth, although it is always fluid, the colour is almoſt always a milk white. In general, however, at other periods of life, a white cataract is of a cheeſy conſiſtence.

2. When a cataract is yellow, a ſmall portion of the lens often remains hard, the reſt of it being diſſolved into a thin tranſparent fluid, forming that variety of the diſeaſe uſually termed the Hydatid Cataract.

3. Although a black cataract is not a frequent occurrence, Mr Pellier ſays he has met with it in different inſtances. The only diſeaſe for which it may be miſtaken is the gutta ſerena; but with due at-

tention, the one may be diſtinguiſhed from the other. In the gutta ſerena the diſeaſe for the moſt part comes on ſuddenly, the pupil is of a deep black, it remains immoveable in every degree of light, and the patient cannot diſtinguiſh colours, or the cleareſt light from perfect darkneſs; whereas in the black cataract, the acceſſion of blindneſs is commonly ſlow and gradual; the pupil, to a certain degree, contracts and dilates on being expoſed to light. The bottom of the eye is of a dark colour, but not of ſuch a deep black as in the gutta ſerena; and the patient can diſtinguiſh light and vivid colours. In ſhort, the ſymptoms of this variety of the diſeaſe are exactly the ſame with thoſe of the common cataract; only, inſtead of being white, the opacity is black.

Mr Pellier prefers the method of cure by extraction, excepting in a few caſes where the pupil is uncommonly ſmall, when he operates by depreſſion. He always prepares his patients for the operation, by confining them to a low diet for

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five or ſix days; by giving two or three doſes of ſalts and ſenna; and when plethora prevails, he takes away ten or twelve ounces of blood.

In extracting the cataract, he makes the inciſion of the cornea in the ordinary place, and of the uſual ſize; but he has ſome peculiarities in his method of doing it.

Inſtead of placing the patient with his face oppoſite to a clear light, he ſeats him with his ſide towards it. If he is to operate upon the left eye, he uſes his right hand, and the right ſide of the patient is placed towards the window. He always uſes his left hand in operating upon the right eye; and in this caſe the patient is made to ſit with his left ſide towards the light.

The patient being ſeated, with the other eye tied down with a bandage, an aſſiſtant ſupports his head behind, while, at the ſame time, he fixes the eye on which the operation is to be performed, with the ſpeculum, fig. 5. Plate XXII. The figure re-

preſents the inſtrument of the full ſize. It is made of wire; and may either be of gold, ſilver, or any other metal. The head being fixed by preſſing it againſt the breaſt with one hand under the chin, the aſſiſtant takes the ſpeculum in the other; and placing the round curvature of one of the ends of it upon the upper eyelid immediately behind the cartilaginous border, he muſt by gentle gradual preſſure upon the eyeball, fix it above, while the operator with the fore and middle fingers of his left hand, when the operation is to be done upon the left eye, muſt fix it below, at the ſame time that he draws down the under eyelid. In uſing this ſpeculum, the upper eyelid is forced almoſt entirely into the orbit behind the eyeball, but it immediately returns to its natural ſituation on the inſtrument being removed.

The eye being thus fixed, the knife, fig. 1. Plate XXII. fixed in its handle, muſt be put into the operator's right hand, who now divides the cornea in the uſual manner: But when the point of it comes oppoſite

oppoſite to the pupil, if the capſule of the lens is to be divided, Mr Pellier has arrived at ſuch dexterity in this operation, that he plunges the point of the knife through the pupil into the lens; and withdrawing it gently, he carries the point of it forward to the oppoſite ſide of the eye, and finiſhes the operation in the uſual way. But in making the latter part of the inciſion, he is very attentive to the preſſure made by the ſpeculum, which he deſires the aſſiſtant to remove entirely before completing the inciſion, in order to prevent the vitreous humour from eſcaping.

This being done, the eyelids are immediately ſhut; and while they are in this ſtate, a ſlow, gradual preſſure is made upon the eyeball, with the flat end of the inſtrument, which he terms a Curette, fig. 1. Plate XXV., which for this purpoſe is placed immediately above the tarſus of the upper eyelid. As the acceſs of light to the eye is thus prevented, the pupil remains in a ſtate of dilatation, by which the

the lens is more eaſily preſſed out than it otherwiſe could be; and if the preſſure is cautiouſly applied, no part of the vitreous humour is ever forced out.

When the cataract does not come out entire, which is ſometimes the caſe, or when it is found to adhere to the contiguous parts, the end of the curette is introduced through the pupil, and any adheſions that take place are gradually ſeparated; at the ſame time that any detached pieces of the lens are turned out through the cut in the cornea: Or, inſtead of the curette, the ciſtatome, fig. 3. Plate XXIV. is ſometimes employed for ſeparating the adheſions.

In the courſe of this operation, it ſometimes happens that the iris is forced too much forward into the anterior chamber of the eye, or even altogether through the cut in the cornea. With a view to prevent the bad effects that might reſult from this, Mr Pellier inſinuates the flat ſide of the curette into the wound in the

cornea, and by means of it endeavours to put the iris into its natural ſituation.

This is the uſual method in which Mr Pellier performs this operation; but circumſtances ſometimes occur that require ſome peculiarity of management. The moſt material of which are theſe: When he has reaſon to think that the cataract is in a fluid ſtate without any opacity of the capſule, inſtead of making an opening in the cornea of the uſual ſize, he inſerts a ſharp-pointed knife, ſomewhat convex on the back, into the inferior part of the tranſparent cornea, at a ſmall diſtance from the iris; and having made an inciſion of about the tenth part of an inch in length, he puſhes the point of the inſtrument upwards till it comes oppoſite to the pupil, when he carries it cautiouſly on till it reaches the lens; and having now made an opening in the capſule ſufficiently large for diſcharging the fluid contained in it, he withdraws the inſtrument with the ſame caution with which it was introduced, and in this manner the operation is finiſhed:

finiſhed: The cataract being in a ſtate of fluidity, the whole of it paſſes eaſily off without any preſſure.

When, again, along with a ſoft or fluid cataract, there is reaſon to ſuppoſe that any part of the capſule is opaque, or even where the capſule alone is ſuppoſed to be diſeaſed, he carefully avoids opening it or burſting it in the courſe of the operation: In either of theſe events, he ſays it would be with difficulty extracted. He therefore by ſlow gradual preſſure with the curette, in the manner I have mentioned, forces out the lens, contained, as he imagines, in its capſule or cyſt; and he does it, he ſays, in every inſtance without forcing out any part of the vitreous humour. In ſome caſes, however, he finds it neceſſary to introduce the end of the curette through the pupil, and to ſeparate the capſule of the lens from the contiguous parts; but even this, he ſays, does no harm to any part of the eye. The importance of our being able to judge from the appearances of a cataract, of the real ſtate of the diſ-

eaſe,

eaſe, is therefore ſufficiently obvious, from the difference which this variety of it requires in the method of conducting the operation.

In extracting the cataract, it is a matter of the firſt importance to avoid the iris with the knife; but as this is extremely difficult in eyes that are not prominent, Mr Pellier often employs a knife with that ſide of it convex which paſſes next to the iris. One of theſe inſtruments is repreſented in Plate XXII. fig. 2. In every other reſpect this knife is the ſame with that which he uſes in ordinary caſes, repreſented in fig. 1. of the ſame plate.

In the courſe of this operation, it ſometimes happens that the aqueous humour eſcapes in too great quantity before the point of the knife is carried acroſs the eye ſo as to penetrate the oppoſite ſide of the cornea: When this takes place, which it often does when the hand of the operator is not perfectly ſteady, as the iris is apt to paſs in before the point of the inſtrument, Mr Pellier adviſes the ſharp-point-

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ed knife to be withdrawn, and another with a probe point, fig. 3. to be introduced at the opening; and the point being ſlowly carried over to the oppoſite ſide of the eye, an inciſion is there to be made, either with the other ſharp-pointed knife or with a common lancet, ſufficiently large for letting out the blunt point of the other; when the operation is to be finiſhed, by puſhing it forward, and making a ſemicircular inciſion in the uſual way in the under part of the cornea.

As ſoon as the cataract is extracted, it is the common practice to preſent a watch or ſome other object to the patient, with a view to diſcover the ſucceſs of the operation. In ſome inſtances Mr Pellier has been forced to conſent to this; but he does not approve of it. Inſtead of this, he immediately cloſes the eyelids, and covers each eye with a ſmall bag of ſoft old linen or cotton about half filled with ſoft fine wool. Theſe bags are applied dry, and are fixed with pins to a circular bandage of old linen paſſed round the forehead,

head, which again is kept firm in its ſituation by a ſlip of the ſame linen made to paſs beneath the chin and over the upper part of the head; care being taken to fix them both with pins to the night-cap below.

The patient is now to be undreſſed, and with as little exertion as poſſible ſhould be laid in bed, upon his back, with his head low: In this ſituation he is deſired to remain with as little variation as poſſible during the firſt ſix or eight days, as it tends more than any other in which he can be placed to a ſpeedy cure of the wound in the cornea. If the patient is not low and emaciated, Mr Pellier always adviſes eight or ten ounces of blood to be taken in the courſe of a few hours after the operation. He keeps him on a low diet, and gives ſmall doſes of opiates from time to time, which anſwer better than a large doſe at once, which often excites ſickneſs and vomiting, ſymptoms that ought to be guarded againſt; for nothing ſo readily hurts the eye after this operation

tion as the exertion of vomiting, coughing, and ſneezing. For which reaſon he does not admit of ſnuff or tobacco in any form being uſed for the firſt eight or ten days.

An eaſy ſtool is procured daily, and on the fourth or fifth day the dreſſings are removed; when after clearing the eye of any mucus or matter that has formed on it, and the eyelid being cautiouſly lifted, the ſame kind of bandage is applied again. From this time forward, the dreſſing is renewed every ſecond day, and in ten or twelve days from the operation, the eye ſhould be bathed before the new bandage is applied, with a weak ſaturnine ſolution; but till this period, warm milk and water is conſidered as preferable. About the end of the third week, the bags of wool, after having been gradually leſſened, are taken away, and a piece of green ſilk put over the eyes inſtead of them. If no unuſual interruption occurs to the cure, the diet is now made gradually better; and when the operation has been perform-

ed on one eye only, Mr Pellier commonly allows the patient to go abroad at the end of the fourth week, but never ſooner; and even then the eyes are kept well covered: But when both eyes have been cut, he adviſes a confinement of at leaſt ſix weeks.

This is the plan of treatment which Mr Pellier purſues in ordinary caſes; and he attributes much of the ſucceſs of his operations to a rigid obſervation of theſe regulations. But where there is a particular tendency in the ſyſtem to inflammation, remedies of a different kind are neceſſary.

The eye becomes in ſome caſes ſo much inflamed even in the courſe of a few hours from the operation, that one bloodletting is not ſufficient. In this caſe he adviſes leeches to be applied to the temple and contiguous parts; and if a ſecond or third general evacuation is neceſſary, he directs the blood to be taken from the foot, as by experience he finds this to anſwer better than taking it from the arm or neck. The patient is deſired to drink plenti-

fully of Arabic emulſion, with a large proportion of nitre. The pediluvium frequently repeated, he finds proves uſeful. And, for the removal of that violent pain which inflammation ſupervening to this operation commonly excites, nothing that has yet been tried, he thinks, anſwers ſo well as a liniment compoſed of the white of an egg and powdered alum beat for a conſiderable time together: A little of which ſhould be applied to the eye every two hours between two plies of ſoft old linen. Beſides affording relief from pain, it tends more effectually than any other remedy to ſtop the progreſs of inflammation; inſomuch, that Mr Pellier employs it in every caſe as ſoon as the eye begins to inflame.

Inſtead of alum, he ſometimes adds to the white of an egg three grains of white vitriol, and the ſame quantity of ſaccharum ſaturni diſſolved in a ſpoonful of roſe water; and the whole being well beat together till it puts on the appearance of white froth, a little of this is inſerted between

between the eyelids with a ſmall pencil three or four times a-day, at the ſame time that the eyelids are covered with a ſmall bag of thin linen in which ſome of it is contained. When the heat and pain attending the inflammation begin to abate, he adviſes a poultice compoſed of a ripe apple, well boiled, with the water preſſed out of it, to which he adds a ſmall quantity of camphor and powdered ſaffron.

By perſevering duly in theſe means the inflammation is commonly at laſt removed. In ſome inſtances, however, this does not happen, and notwithſtanding the utmoſt attention, all the ſymptoms become worſe; the veſſels of the tunica conjunctiva become turgid; the eyelids ſwell to a conſiderable ſize; and the pain, which before was ſevere, becomes inſupportable. In this ſituation, nothing tends to ſtop the inflammation but local bloodletting carried to a conſiderable extent by inciſions made in the affected parts. For this purpoſe the mere diviſion of the turgid veſſels with a lancet or ſmall ſcalpel ſometimes

anſwers; but in general it ſucceeds better by taking away ſmall portions from different parts of the internal ſurface of the eyelids with ſmall convex ſciſſars, ſuch as is repreſented in Plate XXII. fig. 4. This, Mr Pellier obſerves, ſeldom fails of giving immediate relief; he has never found that it does harm afterwards, and the ſtate of the eye being very critical, no remedy ſhould be omitted that affords any chance of obviating the danger; for if this is not quickly done, ſuppuration will ſoon take place, either in the coats of the eye, or in one or both of the chambers, by which the power of viſion is very commonly deſtroyed.

When matter is evidently formed, a frequent uſe of warm emollient ſteam, applied to the eye by means of a funnel of paſteboard, or of any other ſubſtance, will ſometimes produce a ſlow diſcharge of it at the cut in the cornea: But when this does not ſucceed in the ſpace of a day or two, no more time ſhould be loſt; the matter ſhould be diſcharged by an inciſion, made in

in the moſt depending part of the abſceſs, when ſeated in the ſubſtance of the cornea; or, by opening the lips of the inciſion made for extracting the cataract, when the collection is in either of the chambers of the eye. By this means the patient will be immediately relieved from pain, while, at the ſame time, it will give him the only chance of preſerving the uſe of his eye.

During the firſt two or three weeks after this operation, a kind of herniary ſwelling is apt to form in the eye, by the iris or ſome other part being forced out at the opening in the cornea, either by violent coughing, ſneezing, or ſome other effort; and in ſome inſtances, by expoſing the eye too ſoon and too frequently before the cicatrix is ſufficiently firm for reſiſting the preſſure thus produced on it. When the tumor is ſmall, it may commonly be removed by touching it frequently with a ſmall pencil dipped in Goulard's extract of lead, concentrated by evaporation, or in any mild antimo-

nial eſcharotic; an attempt, Mr Pellier obſerves, that may be made with ſafety, if care be taken to prevent the cauſtic from hurting the reſt of the eye, by touching the diſeaſed part only, and immerſing the eye immediately in warm milk, or in ſome warm emollient decoction. But when the diſeaſe is farther advanced, and the tumor firm and ſolid, it anſwers better to remove it entirely either with the ſcalpel or ſciſſars; or if it appears to be any part of the aqueous humour contained in a thin membranous production, as is ſometimes the caſe, all that is neceſſary is, to make an opening into it with a lancet of a ſize ſufficient to diſcharge what it contains. It is ſcarcely neceſſary to obſerve, that after either of theſe operations, the parts muſt be treated with much attention, otherwiſe much harm would ariſe from it. A ſtrict antiphlogiſtic regimen muſt be obſerved. The eye ſhould be lightly covered, either with a ſmall bag, ſuch as I have mentioned above, filled with ſoft wool, or with a compreſs of old

old linen ſoaked in a weak ſolution of ſaccharum ſaturni.

Mr Pellier's method of extracting the cataract, which I have thus endeavoured to deſcribe, with his treatment of the conſequences that ſometimes enſue from it, is the reſult of much experience, and uſually anſwers better than any other with which we are acquainted. Much of Mr Pellier's ſucceſs undoubtedly proceeds from his ſuperior dexterity in performing the operation; but much of it alſo depends upon the minute attention that he gives to every caſe for a conſiderable time after the operation. In ordinary practice, and eſpecially with the moſt part of itinerants, it is commonly ſuppoſed, if the operation is properly performed, and if the cataract comes away eaſily, that little more is required of the operator; but it is much otherwiſe with Mr Pellier, who conſiders the after treatment as ſo eſſential, that he commonly declines to operate where he cannot have the ſubſequent management of the caſe for two or three weeks: And

by conſtant and aſſiduous attention, he is often able to obviate ſymptoms that would otherwiſe prove alarming; and which often might render operations altogether abortive, which might otherwiſe be attended with complete ſucceſs. This I had various opportunities of obſerving.

In the preceding ſection, I entered into a full diſcuſſion of the reſpective merits of the two operations of couching and extracting the cataract; and I then endeavoured to eſtabliſh the preference of the former: But if experience ſhall ſhew, that Mr Pellier's method of operating is attended with more permanent advantages, I ſhall be very ready to retract my opinion; for which purpoſe, I ſhall carefully attend to the conſequences of thoſe operations that he has performed in this country; and as the public will probably be intereſted in them, I ſhall at ſome future period perhaps communicate the event of them.

There are two points of importance in this operation, with reſpect to which I differ

differ in opinion from Mr Pellier. When he conſiders it as proper to divide the capſule of the lens, he frequently does it, as I have already obſerved, by inſinuating through the pupil the point of the ſame knife with which he makes the cut in the cornea, even before the inciſion is completed.

This may poſſibly be done with ſafety by ſuch a very dexterous operator as Mr Pellier: But as moſt practitioners, by imitating him, would run the riſk of hurting the iris, the practice ſhould not be encouraged; for when the capſule of the lens is to be divided, it is ſurely better to do it after the inciſion of the cornea is finiſhed, by lifting up the flap, and paſſing in the end of the blunt probe repreſented in Plate XVIII. fig. 5. or of the ciſtatome, Plate XXIV. fig. 3.

The other point to which I allude, reſpects the practicability of extracting the capſule of the lens, without doing any material injury to the eye.

When

When the cataract appears to be of a firm conſiſtence, and when the diſeaſe is ſuppoſed to be confined entirely to the lens itſelf, Mr Pellier frequently opens the capſule in the manner I have juſt deſcribed, with a view to allow of a more eaſy extraction of the lens; and in this caſe he admits that the capſule remains in the eye: But when he finds, after an operation, that the capſule of the lens becomes opaque, or if he obſerves that any part of it has been previouſly in a ſtate of opacity, he adviſes it to be cautiouſly extracted with ſmall forceps: And again, in every caſe where he ſuſpects the cataract to be fluid, forming what he calls the Cyſtic or Hydatid Cataract, he avoids the diviſion of the capſule, and adviſes the lens to be taken out included in it; which he ſays may be done in the manner I have mentioned, by making an equal and gradual preſſure upon the ball of the eye immediately after the diviſion of the cornea; or by ſeparating any adheſions that take place between the capſule of the lens and the contiguous parts,

parts, with the curette, Plate XXV. fig. 1. paſſed through the pupil.

I have not indeed ſeen Mr Pellier extract the capſule of the lens, after removing the lens itſelf; for no caſes requiring it occurred during his reſidence here: I received, however, full information of his method of doing it, by introducing ſmall forceps at the pupil. But as I cannot imagine how this can be done without injuring the eye materially, I muſt ſtill retain the opinion I advanced of it in a preceding ſection, till I have evident proofs of its being practiſed with advantage. And whenever theſe are offered, I ſhall receive them with much ſatisfaction, as it would in many inſtances be a material improvement of this operation.

We have now to conſider the poſſibility of extracting the capſule entire along with the lens: Several practitioners in this country had opportunities of ſeeing Mr Pellier extract cataracts, as they ſuppoſed, in this ſituation. I ſaw him operate in two inſtances of this kind, where he, as well

well as ſeveral others, imagined that the real capſule was taken out along with the lens; but as I entertain a different opinion on this point, it is proper to ſtate the reaſons which have led to it.

1. The capſule of the vitreous humour, and that which contains the lens, are ſo intimately connected together, that it is difficult, or perhaps impoſſible, for the beſt anatomiſt to determine whether they are ſeparate productions or not: At leaſt they are ſo intimately connected, that they appear to be formed of the ſame ſubſtance, the cryſtalline lens being ſurrounded with a coat which ſeems to be a thin lamella of that which forms the capſule of the vitreous humour. The contrary, I know, has been alleged; but whoever will make the experiment, will find that the capſule of the lens has exactly the appearance that I have mentioned. It appears to be a production of the other; and they cannot be ſeparated without tearing or deſtroying ſome part of one or both of them: Now, if this is the caſe when the contents of the

eye

eye are all laid open, and when all the aſſiſtance can be got that nice diſſection affords, it appears to me impoſſible that they ſhould be ſeparated in the operation of extracting the cataract, without injuring the reſt of the eye, and particularly the vitreous humour, very materially.

2. In performing this part of the operation, viz. in attempting to extract the capſule of the lens entire, Mr Pellier does it by means which do not appear adequate to the intended effect. He does it in moſt inſtances, by making a gradual equal preſſure over the ball of the eye, and not by the introduction of forceps. Now, it is difficult to conceive in what manner preſſure applied to the eye can ſeparate that intimate connection which certainly takes place between the capſule of the vitreous humour and that of the cryſtalline lens: By preſſure they are frequently both forced out; but no operator would wiſh to meet with this, and no perſon guards with more anxiety againſt it than Mr Pellier, inſomuch, that the eſcape of the vitreous humour,

humour, or even of any part of it, is an occurrence he rarely meets it. In ſome caſes, indeed, Mr Pellier inſinuates his curette, as I have already remarked, through the pupil, with a view to detach the capſule of the lens from the contiguous parts: He allows, however, that this is not always neceſſary; and beſides, there is much cauſe to ſuſpect, that the eye would often be hurt by it.

3. When it is found, however, as I have already obſerved, either during the operation or afterwards, that the capſule of the lens is opaque, even Mr Pellier himſelf does not attempt to extract it by preſſure. In this caſe he does it with forceps paſſed through the pupil. Now, if preſſure anſwers in one variety of the diſeaſe, it ought probably to do ſo in others, ſo that the uſe of forceps ſhould not be neceſſary; but it is only in the hydatid or ſoft cataract which Mr Pellier allows that this practice by preſſure ſucceeds.

4. But

4. But as ſeveral practitioners, both here and elſewhere, have ſeen Mr Pellier extract the cataract, ſurrounded, as they imagined, with its proper capſule; and as he aſſerts with confidence, that it may be done merely by preſſure; it will be aſked, In what manner is this apparent contradiction to be explained? I can account for it only on the ſuppoſition of there being in all ſuch caſes, where this practice of extracting the capſule entire is conſidered as admiſſible, a preternatural formation of a new membrane within the capſule of the lens; which being of a firmer nature than the capſule itſelf, and probably very little, if at all, attached to the contiguous parts, we can eaſily ſee how it may be forced out entire, even by moderate preſſure, and how eaſily byſtanders may be deceived with it. When I firſt ſaw it done by Mr Pellier, as he previouſly ſaid that he would extract the whole capſule along with the lens; as I had heard from very reſpectable authority that he had done it in different inſtances in Glaſgow; and as I certainly

ſaw

ſaw the cryſtalline puſhed out, ſurrounded with a membranous bag, I muſt own that I was nearly converted to Mr Pellier's opinion: But on further conſideration, the reaſons I have mentioned againſt it appeared too concluſive, even for this weight of evidence, to remove; and ſince that period, a circumſtance has occurred, which with me puts the matter beyond a doubt. A cataract of a ſoft nature was extracted by Mr Pellier, ſurrounded with this membrane or bag quite entire. From the firſt I doubted much of its being the proper capſule of the lens, as it was ſaid to be; for this tunic is well known to be exceedingly fine and delicate; whereas this membrane was firm, and required ſome degree of force to tear it. The patient, however, diſtinguiſhed objects immediately after the operation; and what was then advanced concerning it could not be well refuted: But by ſome cauſe or other, poſſibly from the eye becoming inflamed, an opacity ſoon began to form in the old ſite of the cryſtalline, directly behind the pupil,

forming to all appearance a real cataract; and it now continues, even after the inflammation is removed. Whatever explanation may be given of this by thoſe who are inclined to ſupport the contrary opinion, it proves to me a convincing proof that ſome deception takes place where the capſule is ſuppoſed to be extracted entire along with the lens; for in this caſe, where the capſule was imagined to be taken entirely out, the opacity which ſucceeded, and which ſtill exiſts, appears evidently to be ſeated in the capſule, and no where elſe. I therefore conclude, where practitioners have imagined the capſule was extracted entire, that they have been deceived by the lens being enveloped with a preternatural bag or cyſt, formed perhaps by an inflammatory exſudation from the internal ſurface of the capſule: That this production, however, is certainly formed in this manner, I will not poſitively aſſert; but in my opinion it is the moſt probable way by which we can account for it.

Theſe are the remarks that I have to offer on Mr Pellier's theory and practice in the treatment of cataract. If further obſervation ſhall convince me that I am wrong, I will readily acknowledge my miſtake; but, in the mean time, the reaſons I have adduced, appear to evince the impropriety of extracting the capſule piecemeal, by means of forceps paſſed through the pupil, as well as the impoſſibility of making it paſs entire along with the lens.

It ſometimes happens in ſmallpox, as well as in ſevere inflammation of the eye from whatever cauſe it may proceed, that the centre of the cornea is left in a ſtate of opacity, by matter forming between the coats of it. When not carried off by the remedies uſually employed, if the iris, retina, and other parts of the eye appear to be ſound, Mr Pellier adviſes an operation, from which he has in different inſtances derived much advantage. The centre of the cornea being opaque, the rays of light are thus prevented from paſſing to the bottom of the eye through the pupil;

pupil; but when the ſides or external border of the tranſparent cornea ſtill remain clear and ſound, light may be allowed to paſs to the retina, by enlarging the pupil; which, Mr Pellier ſays, may be done with ſafety by making an inciſion from one ſide of the iris to the other. And his method of doing it is this: He firſt makes an opening in the prominent part of the cornea, in the ſame manner as for extracting the cataract: He then inſerts a ſmall grooved director beneath the flap of the cornea through the pupil; and having paſſed it in a horizontal direction, immediately behind the iris, towards the outer angle of the eye, he now takes a pair of ſmall curved ſciſſars, and paſſing one of their blades along the groove of the director, he at once divides this part of the iris, when he withdraws the inſtruments, and makes a ſimilar cut on the oppoſite ſide of the eye. In this manner, when the opacity is confined to the centre of the cornea, which it often is, the rays of light which paſs through the ſides of it get acceſs to the

bottom of the eye, by the pupil being extended from one ſide of the iris to the other; and thus a degree of viſion is produced which could not otherwiſe be obtained. It will readily be imagined, that perfect viſion is not to be obtained in this ſtate of the eye: various reaſons indeed concur againſt it: But it is a matter of importance for a perſon already totally blind to be rendered capable of finding his way, and of conducting himſelf from one place to another, which, by this operation, Mr Pellier has done in different inſtances: And, ſo far as I know, the public are indebted to him alone for propoſing it.

After the operation, the eye muſt be tied up, and treated in the ſame manner and with the ſame attention as is done after extracting the cataract; for where ſo much violence is done to the eye, if inflammation be not guarded againſt, much miſchief may enſue from it.

In deſcribing the method of dividing the iris, I have ſaid that it ſhould be done with ſciſſars; for this membrane being looſe

looſe and unſupported, it would yield before the edge of the ſharpeſt knife. In the introduction of the director and ſciſſars, care ſhould be taken, in paſſing them between the iris and lens, not to injure either the lens or its capſule; that is, when the diſeaſe is not complicated with cataract; for when the cryſtalline is opaque, it ſhould be extracted.

In the treatment of the fiſtula lachrymalis, Mr Pellier has much merit; for, with moſt operators, it often happens that no permanent advantage is obtained from any of the remedies that they employ, and even thoſe who prove moſt ſucceſsful very frequently fail. Mr Pellier does not ſay that he always ſucceeds; but he does ſo in moſt inſtances; and I know that his method has often proved ſucceſsful where others have failed.

In a confirmed fiſtula lachrymalis, the curative intention is, to form an opening between the lachrymal ſac and the correſponding noſtril. In Section XVIII. of this chapter, I have ſhewn that this is ac-

compliſhed in different methods; by ſearching with a blunt probe, to diſcover the natural paſſage: if this fails, by making an artificial opening through the os unguis; and when neither of theſe ſucceed, by leaving a tube or canula, either in the natural or artificial opening, for the purpoſe of conducting the tears to the noſe.

As we know from experience, that the operation fails frequently from the paſſage becoming again impervious, and this whether it may have been done by opening the natural paſſage or by forming another, it would be the idea perhaps of moſt practitioners to leave a tube in the opening, were it not liable to one very important objection, namely, the uncertainty of its continuing fixed in its ſituation; for hitherto we have not been poſſeſſed of any certain method of preventing the canula either from riſing and forcing its way out at the corner of the eye, or from paſſing down and coming out at the noſe. In Plate XX. I have delineated various forms of tubes that have been uſed for this purpoſe;

poſe; and of theſe, figures 3. and 10. will frequently be found to anſwer: For when preſſed ſufficiently into the opening through the os unguis, the bulge or prominence with which they are furniſhed above, for the moſt part prevents them from riſing, while their conical ſhape prevents them from paſſing into the noſe. I muſt, however, acknowledge, that they ſometimes fail; and that an invention of Mr Pellier's anſwers better. Mr Pellier aſſerts, that when properly introduced, it never fails; and from any experience that I have had of it, I am clearly of the ſame opinion. In a patient of mine, on whom the operation was performed upwards of fifteen years ago, and in others where it was done nine or ten years ago, the tubes are ſtill firm and immoveable, and anſwer the purpoſe of giving a free paſſage to the tears. Two repreſentations of theſe tubes are given in Plate XXV. figures 5. and 6. They may be made either of gold or lead. Mr Pellier commonly employs lead: But when of gold, the tube is leſs bulky; and

as this metal receives a finer poliſh, by which the opening through it is not ſo readily filled up with the tears, it ought, I think, to be preferred.

The peculiarity of form of Mr Pellier's tubes conſiſts in their having two projecting edges; one at the top forming a kind of brim, correſponding as nearly as poſſible to the ſize of the lachrymal ſac; and the other near to the middle between this and the other end of the inſtrument; by which means, when properly fixed in the paſſage where it is to remain, it is kept firm in its ſituation by the granulations that ſhoot out from the contiguous parts; and which, by graſping as it were that part of the tube which lies between the two projecting edges, effectually prevent it from paſſing either up or down; and hence that material inconvenience is avoided, of which practitioners, who employ cylindrical tubes, always complain.

It is neceſſary, however, to obſerve, that the utmoſt nicety is required in the uſe of theſe as well as of every variety of tube;

tube; not merely in accurately adapting them to the ſize of the openings through which they are to paſs; but afterwards in aſcertaining the depth to which they ſhould be preſſed into the noſe: For if a tube be either too ſmall or too large for the opening through the os unguis, we may readily imagine that it will not anſwer; and if it is preſſed even in a trifling degree too far into the noſtril, it will neceſſarily irritate the lining membrane of that cavity, ſo as to create much pain and inconvenience. The tubes repreſented in Plate XXV. are of a ſize both in length and thickneſs that anſwers for the moſt part of adults, but practitioners ſhould be provided with various ſizes.

The method of uſing them is this. After laying the lachrymal ſac freely open in the uſual way, the natural conduit of the tears is ſearched for, either with a firm probe, or with the conductor, Plate XXV. fig. 2.; and Mr Pellier aſſerts, that he never fails in finding it. As ſoon as this is diſcovered, the tube muſt be put upon

upon the conductor, previouſly furniſhed with the compreſſor, fig. 3. as in fig. 4.; and the tube ſhould be of ſuch a ſize that the conductor may fit it exactly in point of thickneſs, while the end of this part of the inſtrument is ſo much longer as to paſs through the tube about the tenth part of an inch. The point of the conductor is now to be inſinuated into the lachrymal duct; and being puſhed in till it reaches the noſtril, which may be known either by paſſing a probe up the noſtril, or by a few drops of blood being obſerved to fall from the noſe, the conductor being no longer neceſſary, muſt be withdrawn, taking care to leave the compreſſor upon the upper brim or edge of the canula; which muſt be firmly preſſed down with it in the left hand, while the conductor is removed with the other. If this precaution be not taken, the canula would be brought out along with the conductor; but this inconvenience is thus very effectually guarded againſt, while the ſame inſtrument ſerves more eaſily than any other to preſs the canula

nula to a ſufficient depth in the lachrymal duct; a point of the firſt importance in this operation; for if the canula be not firmly fixed at the firſt attempt, it will not afterwards be ſo eaſily done.

This being accompliſhed, the compreſſor muſt be taken out; and, with a view to diſcover whether the canula is at a proper depth or not, a little milk and water ſhould be injected through it with the ſyringe, Plate XX. fig. 1. If the injection paſſes eaſily into the noſtril, there will be no reaſon to doubt of the canula being properly placed; but, if any obſtruction occurs, there will be reaſon to fear that it is already puſhed too far, and that it preſſes againſt the os ſpongioſum inferius; in which caſe the canula ſhould be withdrawn, with a view to ſhorten it, when it muſt be again introduced in the manner I have mentioned.

As the wound recently made in the ſac will yield a large quantity of matter, it ought to be kept open for eight or ten days with a bit of ſoft lint ſpread with any emollient

emollient ointment, taking care to cover the whole with a compreſs of ſoft old linen, ſecured with a proper bandage. An injection of milk and water ſhould be daily paſſed through the canula; and at the end of this time, or whenever the ſuppuration is much diminiſhed, and the ſore looking clean and in a healing ſtate, the doſſil of lint ſhould be removed; and a piece of court-plaſter being laid over the ſore, it may in this ſtate be left to heal, care being taken to renew the plaſter occaſionally, if any matter appears to form beneath it.

By this mode of treatment, caſes of fiſtula lachrymalis that do not depend on diſeaſe of the contiguous bones, or on any latent diſeaſe of the conſtitution, will for the moſt part, as Mr Pellier obſerves, be completely cured in three weeks, nay ſometimes in a fortnight, which by the uſual practice might require three, four, or five months.

In Plate XXVI. I have delineated the form of tube, as well as all the other parts of the apparatus employed for this operation,

tion, by Mr Wathen; but although the invention is ingenious, and may anſwer in a great proportion of caſes, as Mr Pellier's tubes appear to me to be better adapted to the form of the lachrymal paſſages, while his mode of introducing them is more ſimple, I think it probable that they will meet with a preference.

As I have been witneſs of the moſt complete ſucceſs of Mr Pellier's practice in this diſeaſe, I have conſidered it as a point of juſtice, not only to Mr Pellier, but to the Public, to give this full detail of it. If I had not indeed been convinced of the ſuperior utility of Mr Pellier's practice, and of the unreſerved manner in which he communicated his knowledge of the diſeaſes of the eyes, I ſhould have deemed it impertinent to have given the preceding account of either to the Public.

Since the firſt edition of this was publiſhed, the opinion which I then ſuggeſted, of the impoſſibility of extracting the

capſule

capſule of the lens entire, has been the ſubject of much inveſtigation: And as it now appears that it cannot be done, I ſtill conclude that Mr Pellier, and others who ſupported a different opinion, have been deceived.

CHAP-

CHAPTER XII.

Of the Diſeaſes of the NOSE *and* FAUCES.

SECTION I.

Anatomical Deſcription of the NOSE *and* FAUCES.

A MINUTE deſcription of theſe parts is not neceſſary for our purpoſe; but a few remarks on their general form and ſtructure will ſerve to elucidate the nature of the diſeaſes to which they are liable.

The

The external prominent part of the noſe is chiefly compoſed of bones and cartilages, which ſerve to protect the more deep-ſeated parts of the organ of ſmell, and to form a kind of vaulted paſſage for the air to the throat.

This paſſage, divided by the ſeptum naſi, forms the noſtrils, which extend almoſt in a horizontal direction from the ſuperior part of the upper lip backwards to the pharynx, where they terminate above the velum pendulum palati.

The ſuperior and lateral parts of the arch of the noſe, are formed by the naſal proceſs of the os frontis,—by the two oſſa naſi,—by the oſſa unguis,—and by an extenſive proceſs from each of the oſſa maxillaria, to which the cartilaginous alæ of the noſe, covered by the common teguments, are immediately attached.

The ſeptum narium is formed by the naſal proceſs of the ethmoid bone,—the vomer,—middle cartilage of the noſe,—and ſpinous proceſſes of the palate and maxillary bones.

The

The under part of the cavity of the noſe is anteriorly bounded by a horizontal proceſs of the oſſa maxillaria, and backwards by a proceſs of a ſimilar form, from each of the oſſa palati. The ſphenoid and ethmoid bones form the boundaries of the poſterior part of the nares.

Towards the upper part of the noſe we meet with a very beautiful contrivance of nature for enlarging the organ of ſmell. In the ſuperior part of each noſtril, oppoſite to the ſeptum, we find a ſpongy, cellular production of bone, proceeding from the os ethmoides, which, from their form, texture, and ſituation, are termed Conchæ, Oſſa Spongioſa, or Oſſa Turbinata Superiora: And beneath theſe, on the ſame ſide of the noſtrils, are two bodies of a ſimilar texture, which have likewiſe been ſuppoſed to be productions of the ethmoid bone, but of which there is no evidence; which, from their ſituation, are termed Oſſa Spongioſa Inferiora. In ſome inſtances, two, and even three, ſmall bones of this kind are

met with in each noſtril; but this is not a frequent occurrence.

Theſe bodies being prominent and irregular on their ſurfaces, give the noſtrils a winding, or even a crooked appearance: But every practitioner will know, that they are ſo in appearance only; inſomuch that a probe may be paſſed almoſt in a ſtraight line from the external nares to the throat.

We meet with ſeveral openings which terminate in the noſtrils, with ſome of which it is material for ſurgeons to be acquainted, namely, the ductus inciſorii, which commence at the under and back part of the noſtrils, and terminate behind the dentes inciſivi of the upper jaw;—the ſinuſes of the ſphenoid and frontal bones, which both open into the upper part of the nares;—the ſinus of each maxillary bone, commonly termed the Antrum Maxillare, or Highmorianum, which opens into the noſe between the upper and under oſſa ſpongioſa of the ſame ſide;—and laſtly, the ducts of the lachrymal ſacs, which

in

in the preceding Chapter I have had occaſion to deſcribe, and which terminate on each ſide immediately beneath the os ſpongioſum inferius.

All the cavity of the noſtrils; the different ſinuſes I have mentioned, as well as the paſſages which lead to them; the whole ſurfaces of the oſſa ſpongioſa, and even the fauces, are covered or lined with a thick ſoft membrane, which, from its affording a plentiful ſecretion of mucus, is commonly termed Membrana Pituitaria, or Membrana Schneideri, from Schneider, the firſt anatomiſt who gave an accurate account of it.

This membrane appears to be a continuation of the cuticle. Towards the external nares, near to its connection with the epidermis, it is exceedingly thin; but as it proceeds backward upon the ſeptum naſi and oſſa ſpongioſa, it acquires a conſiderable degree of thickneſs; and again becomes thin as it proceeds to line the different ſinuſes.

The cavity of the noſe, as I have already remarked, is ſeparated from the mouth by a plate of bone, formed by a proceſs from each of the oſſa maxillaria, and by the oſſa palati. To the poſterior edge of the laſt mentioned bone there is a firm membrane connected, termed the Velum or Valvula Palati, formed by a junction of the common membrane of the mouth, with a continuation of the Membrana Schneideri, together with ſeveral muſcular faſciculi, intended for the motion of this and the contiguous parts. This membrane, as it ſtretches back from the palate, falls down and terminates in the uvula immediately above the root of the tongue; by which it is not only well fitted for preventing the food, during maſtication and deglutition, from paſſing up to the noſe, but for conveying back to the pharynx all ſuch parts of the mucus furniſhed by the membrane of the noſe, and contiguous ſinuſes, as are not diſcharged by the external nares.

On each ſide of the throat, at the termination of the velum pendulum palati, there is

is situated a prominent glandular substance, commonly termed the Amygdalæ or Almonds of the Ear. They are naturally of a soft, yielding texture; and in general they have excavations of different degrees of deepness on various parts of them, which, by those not acquainted with the usual appearances of these parts, are often mistaken for ulcerations. On looking farther into the throat, along the course of the tongue, a thin, elastic, cartilaginous body is observed, termed Epiglottis, which is so placed as to prevent the food from falling into the trachea in its passage from the mouth to the pharynx, a wide capacious bag, which terminates in the œsophagus, and occupies all that part of the throat that is seen on looking into the mouth.

From this description it is evident, that the pharynx is furnished with several openings or outlets. Below, it terminates in the œsophagus;—anteriorly, it communicates directly with the mouth;—and from the superior part of the bag it has a free

direct communication with the poſterior openings of the noſtrils.

I ſhall now proceed to conſider the diſeaſes of theſe parts, and the operations that are practiſed for them. The ſubjects are, —Hemorrhagies from the Noſtrils,—Ozæna, — Imperforated Noſtrils, — Polypous Excreſcences in the Noſe and Throat,— Extirpation of the Amygdalæ and Uvula, —Scarifying and Fomenting the Throat.

SEC-

SECTION II.

Of Hemorrhagies from the Noſtrils.

THE internal parts of the noſe are ſupplied almoſt entirely with blood from the internal maxillary artery: In general, the branches of this artery that go to the noſe are ſo ſmall, as to render a diviſion or rupture of them an object of little importance; but, in ſome inſtances, it is otherwiſe, and hemorrhagies occaſionally occur from theſe parts that give much anxiety and diſtreſs to practitioners, and prove very hazardous to patients. They have ſometimes even baffled every attempt that could be made to reſtrain them; ſo that, however inconſiderable this evacuation may in a great proportion of inſtances be, it ought, in every caſe, to be treated with attention.

In a great proportion of caſes, a proper application of cold puts a temporary ſtop to the diſcharge; and in general, any future returns of it may be prevented by bloodletting, a moderate uſe of cooling laxatives, and a low regimen.

In order to obtain all the advantages that may be derived from cold, it muſt be employed in various ways, and to a conſiderable extent. The patient ſhould be placed in a large apartment, with a current of cold air paſſing through it: His food and drink ought all to be cold: His face ſhould be frequently bathed, and even immerſed, in cold water, or in cold water with a proportion of vinegar: The mouth ſhould be kept filled from time to time with a cold ſolution of alum, or any other aſtringent: Compreſſes, wet in any liquid of this kind, ſhould be applied over the noſe: When in bed, the patient ſhould be lightly covered; and he ſhould ſleep with his head as high as poſſible.

By theſe means being duly continued, naſal hemorrhagies may in general be removed;

moved; but in some instances no benefit is derived from them, the flow of blood not being in any degree diminished by whatever care and assiduity they happen to be applied.

In such cases, compression of the ruptured bloodvessel is alone to be depended on; but when deeply seated in the nostril, the application of pressure is both difficult and uncertain. It sometimes happens that a dossil of lint passed into the bleeding nostril will put an immediate stop to the discharge. This, however, is rare; for the extent and diameter of the passage through which the dossil is pushed being very unequal, the effect produced by it must likewise be so: Hence we cannot place much dependence on this method of applying pressure.

In former editions of this work, when treating of the discharge of blood from the anus in cases of piles, I advised the application of pressure by the introduction of a piece of gut, tied at one end, into the rectum, and by filling it at the opposite extremity

tremity with any cold liquid, to increaſe the preſſure by forcing up the liquid, and ſecuring it with a ligature. The ſame remedy may be employed in hemorrhagies from the noſe. It has already been ſucceſsfully uſed in a few inſtances; and may frequently, I think, be employed with advantage. A piece of hog's gut, previouſly dried and moiſtened again, anſwers beſt. One end of it firmly tied with a bit of ſmall packthread, ſhould, by means of a probe or director, be puſhed along the whole courſe of the noſtril from which the blood is diſcharged, to the upper end of the pharynx. The gut ſhould now be filled with cold vinegar, water, or any other cold liquid, by means of a ſyringe inſerted at the end hanging out at the noſtril; and as much being injected as the gut will admit, the whole ſhould be preſſed as far up as poſſible, and ſecured in this ſituation with a ligature.

In this manner a very conſiderable degree of preſſure may be applied; and ſome advantage may be derived from the application

cation of cold directly to the vessel from whence the blood is discharged. In some instances, however, even this may fail, owing to the ruptured artery being so situated that pressure cannot in this manner be directly applied to it. In such circumstances, other means must be employed, and the following very commonly answer.

Let the curved instrument, fig. 4. Plate XXX. be inserted at one of the nostrils with a piece of catgut or firm waxed thread contained in it; and being conveyed into the throat, the ligature must be laid hold of with forceps or the fingers, and taken out at the mouth; when the instrument is to be withdrawn, and again introduced at the other nostril with a ligature of the same kind, to be likewise taken out at the mouth. A bolster of soft lint, of a sufficient size for stuffing or filling the posterior nares, is now to be firmly tied to the two ends of the ligatures hanging out at the mouth, when the opposite ends of them must be pulled forward at the nostrils till the cushion of lint is firmly applied to

and

and fixed in the upper part of the pharynx; when a compreſs of linen muſt be applied to each noſtril, and fixed in this ſituation by tying the ligatures over it. The patient ſhould now be laid to reſt. If the bolſters of lint have been properly applied, no blood will eſcape either from the poſterior or anterior nares; any blood that is effuſed into the noſtrils will ſoon coagulate, and thus a ſtop will be put to the hemorrhagy. It is evident, however, that in order to inſure ſucceſs, the bolſters of lint ſhould not only be accurately applied, but continued for a length of time ſufficient for admitting of the healing or re-union of the ruptured bloodveſſels.

In fixing the bolſter of lint in the back part of the mouth, I have adviſed two ligatures to be employed; one to be paſſed through each noſtril. In this manner it may be applied not only more firmly, but more equally, than by the uſual method of paſſing only one ligature through that noſtril from whence the blood is diſcharged. I alſo think it right to remark, that a ligature

ture should be attached to the bolster of lint in the pharynx, of a sufficient length to hang out at the mouth, by which the bolster may be withdrawn on the hemorrhagy being stopped: Otherwise, when the bolster is firmly fixed behind the velum pendulum palati, it cannot be removed but with much trouble, both to the surgeon and patient, of which I have met with different instances: In one of these, after various attempts had been made for taking the bolster away, it was allowed to remain for three or four weeks, till it fell into the throat during sleep, when it nearly suffocated the patient before being got out.

SEC-

SECTION III.

Of an Ozæna.

THE term Ozæna has in general been applied to ſuch ulcers of the noſe as are foul; that diſcharge a fetid matter, and are attended with a carious ſtate of one or more of the bones; whilſt by ſome the ſame general denomination of ozæna is applied to every ulcer in the noſtrils, whether attended with caries or not.—At preſent I ſhall adhere to this laſt acceptation of the term.

Every catarrh affecting the lining membrane of the noſe, ſerves in a greater or leſs degree to excite an inflamed ſtate of the parts in which it is ſeated. But this in general terminates eaſily, and the inflammation is removed by a plentiful diſcharge either of mucus or thick yellow matter. In ſome inſtances, however, even after

after every other catarrhal symptom is removed, this discharge of matter continues obstinate, either from ulceration alone, or perhaps from ulceration conjoined with fulness and swelling of the lining membrane of the nose.

Exposure to cold is to be considered as the most frequent cause of this state of the disease; but external violence of every kind that terminates in an inflamed state of the membrane of the nose, such as the application of acrid irritating substances, blows and bruises, may likewise tend to produce it.

When the system is not otherwise diseased, this is the most simple variety of an ozæna; and as in this state we suppose it to be perfectly local, local remedies ought alone to be employed.

In this state of the disease, we trust chiefly to the use of drying and astringent applications. Of these, decoctions of walnut-tree leaves, or of Peruvian or oak bark, mixed with a solution of alum, solutions of white vitriol, and strong saturnine solutions,

ſolutions, are perhaps equal if not preferable to any. Brandy or any other ardent ſpirits diluted with water, and lime-water, may likewiſe be employed with advantage.

Doſſils of ſoft lint ſoaked in any of theſe ſhould be introduced into the noſtril three or four times daily, and puſhed up ſo as to be brought in contact with the diſeaſed parts; and every night at bed-time an ointment ſhould be applied, prepared with a large proportion of calcined zinc or lapis calaminaris.

By a due continuation of theſe means, almoſt every local diſeaſe, depending on ulceration of the membrane of the noſe, will at laſt be removed. But inſtances have occurred of other diſeaſes being miſtaken for ſores in the noſe, and of the running produced by them continuing to reſiſt every effort that could be made for removing it. This is particularly the caſe with collections of matter in the antrum maxillare.

In the anatomical deſcription I have given of theſe parts, we have ſeen, that there is

is naturally a passage or opening from the antrum maxillare into the nose immediately below and covered by the os spongiosum inferius of the same side. In collections of matter in this cavity, when large in quantity, it is occasionally discharged by this outlet into the nose in every posture of the body, and almost always when the patient lies on the sound or opposite side, if the passage be not obstructed. The method of treatment best suited for the removal of collections in the antrum maxillare, will be the subject of a section in the next chapter: At present I have only to say, that in diseases attended with a discharge of matter from the nose, practitioners should be on their guard, lest, by mistaking one disease for another, mischief may be done; not only by a misapplication of remedies, but by those means being omitted from whence alone any real advantage could be derived.

When, again, the matter discharged from an ulcer in the nose is thin, fetid, and of a brown or somewhat black colour, as this

gives cauſe to ſuſpect that the contiguous bones are carious, it would be in vain to expect a cure till theſe are removed. We may in general know that caries exiſts, by the peculiar fetor of the matter which the ſores afford: but when any doubt remains of this point, we have it commonly in our power to have it aſcertained by the introduction of a probe.

As a carious ſtate of the bones of the noſe occurs more frequently from lues venerea, than from any other cauſe, this ſhould be kept in view in every ſymptom of this kind: And whether we may be able to trace it with certainty as a ſymptom of this diſeaſe or not, whenever there is the leaſt cauſe for ſuſpicion, the patient ſhould without heſitation be put on a long-continued courſe of mercury. From whatever cauſe the diſeaſe may have ariſen, mercury will not probably do harm; and as I have ſeen it prove uſeful even where no venereal taint has exiſted, I now in general, in all ſuch caſes, adviſe it immediately.

In

In the mean time, the local treatment of the ſores ſhould not be neglected. The parts ſhould be bathed from time to time with one or other of the decoctions I have mentioned; and as the ſoft ſpongy bones of the noſe are apt, when carious, to produce troubleſome fungous excreſcences; ointments, impregnated with corroſive applications, ſhould be employed occaſionally; and of theſe there are none I have ever employed that anſwer ſo well as prepared verdegris, calomel, or red precipitate. A general prejudice indeed prevails againſt the uſe of remedies of this kind in diſeaſes of the internal parts of the noſe, from a fear of their doing harm, by irritating the very ſenſible membrane to which they are applied. There is no good cauſe, however, for this timidity; and I can ſay from experience, that ointments, ſuch as I have mentioned, of a ſtrength ſufficient for keeping down fungous excreſcences, may be employed with much ſafety, and without any riſk of hurting the contiguous parts. It is ſcarcely neceſſary to remark,

that in the uſe of remedies of this kind, ſome caution is neceſſary, in adapting the ſtrength of the article to the parts to which it is to be applied. The internal ſurface of the noſe will not bear the ſame degree of irritation that may with ſafety be applied to ſome other parts of the body; but it will bear the application of corroſive ointments more ſtrongly impregnated than is commonly imagined. A liniment compoſed of wax and oil, with an eighth or ninth part of red precipitate, may be employed with ſafety, and the corroſive powers of it can be occaſionally increaſed or diminiſhed; calomel may be uſed in a larger proportion, and twenty grains of verdegris may be added to an ounce of liniment. The growth of fungous excreſcences being thus prevented, and the ſores kept clean by the frequent uſe of an aſtringent antiſeptic waſh, the paſſage of the noſtril will be preſerved pervious, the diſeaſe will not ſpread ſo readily, and the carious bone will be more quickly ſeparated and thrown off than

than when these circumstances are overlooked.

Till the caries is removed, no permanent cure will take place. The treatment therefore that I have just pointed out should be continued till this is fully accomplished. Indeed, after a sufficient quantity of mercury is exhibited for the removal of any latent venereal taint that might exist in the system, all that we can expect further from art, is to assist in the manner I have advised, in effecting a separation of such bones as are diseased. This being done, the sores will assume a milder aspect, and will in general heal by a continuance of the astringent applications alone.

This is the practice which by experience I have found to answer best in cases of ozæna. It must, however, be acknowledged, that no remedies with which we are acquainted will at all times succeed. This kind of ulcer proves always tedious, not only from the difficulty of reaching the

ſore with proper dreſſings, but from the oſſa ſpongioſa, when they become carious, being always ſlow in exfoliating. When, however, the ſyſtem is not otherwiſe diſeaſed, the means that I have mentioned will very commonly ſucceed at laſt.

SEC-

SECTION IV.

Of Imperforated Nostrils.

Children are not unfrequently born with the vagina or anus in an imperforated ſtate; and although we know of no reaſon why the noſtril ſhould not in like manner be often imperforated at birth, we are certain that it is a rare occurrence. Every practitioner, however, muſt have met with ſome inſtances of preternatural adheſions of the noſtrils, the conſequence of confluent ſmallpox, of burns, or venereal ſores.

Adheſions of this kind are in various degrees. In ſome caſes the noſtrils are only ſlightly contracted, without producing any material impediment to reſpiration: In others, they are ſo much drawn together, as hardly to admit a common probe or a ſmall quill: And in a few, the paſſage is entirely obliterated.

In caſes of this kind, it is the object of ſurgery to remove the cauſe of obſtruction as completely as it can be done, and when an opening is left, however ſmall it may be, much aid may be derived from it in effecting our intention. A ſmall grooved director being paſſed into the opening, it may be eaſily enlarged to its natural ſize, by running a ſmall biſtoury or ſcalpel into the groove, and thus dividing the parts which adhere: But when there is no paſſage whatever, whether the effect of natural conformation, or of any other cauſe, we ſhould, in the firſt place, by ſlow diſſection with a ſmall ſcalpel, endeavour to diſcover one of the noſtrils, taking care, with as much caution as poſſible, to keep the opening in a proper direction, between the ſeptum naſi and the contiguous external cartilage: And the paſſage being once diſcovered, it muſt be enlarged to the natural ſize in the manner I have mentioned, by the introduction of a director and biſtoury. This being done in one noſtril, we endeavour,

vour, by the same cautious dissection, to discover the other.

A clear opening being thus formed in each nostril, our next object is to preserve it of a full size, and to prevent the parts from adhering again; which by experience we know they would do, and which much attention alone can prevent.

The introduction of dossils of lint of an adequate size, or of any other soft substance, retaining them till there is no risk of future adhesions, and taking care to withdraw them daily, in order to cleanse or renew them, might answer the purpose: But metallic tubes, adapted to the size of the openings, while they admit of free respiration through the nostrils, serve to distend the parts with more equality, and are more easily retained in their situation. Before being introduced, they should be covered with soft leather spread with any emollient ointment; by which they sit with more ease, and are more readily withdrawn at the different dressings.

Various

Various forms of tubes have been recommended for this purpoſe. Thoſe repreſented in fig. 2. Plate XXX. are of a form that anſwer perfectly well; and they are eaſily retained either with a bandage round the head, or with adheſive plaſters for attaching them to the contiguous parts. They ſhould be continued as long as any degree of ſoreneſs or excoriation remains in the courſe of the inciſions; for if withdrawn before the ſores are healed, new adheſions or contractions would very commonly enſue.

It ſometimes happens from burns, as well as from the confluent ſmallpox, that along with a contraction, or perhaps a total obliteration, of one or both noſtrils, an adheſion is produced between the noſe and ſkin of the upper lip. In this caſe, the adheſion of the lip to the noſe ſhould, in the firſt place, be removed with a ſcalpel; and the ſore thus produced ſhould be firmly cicatriſed before we attempt to open the noſtrils. It is ſcarcely neceſſary to remark, that, during the cure, the ſore ſhould not only

only be kept properly covered, but with a view to remove any improper contraction which the lip may have acquired, it ought at each dreſſing to be tied down with ſeveral turns of a double-headed roller paſſed round and over the head.

SEC-

SECTION V.

Of POLYPI *in the* NOSE *and* THROAT.

THE lining membrane of the noſe is liable to excreſcences, which, from their ſuppoſed reſemblance to inſects of that name, have commonly been termed Polypi. Every part of the naſal cavity, and of the back part of the throat, is liable to theſe excreſcences; but moſt frequently they ariſe from that part of the membrane of the noſe that lines or covers the oſſa ſpongioſa. For the moſt part they are confined to one ſide of the noſe, and they do not commonly appear ſo far back as the throat; but in ſome inſtances they occupy both noſtrils, and in others they are ſo large, as to be diſtinctly perceived on looking into the pharynx. In ſome caſes, indeed, they are found to ariſe in the pharynx.

The

The first warning that a patient commonly receives of this disease, is a partial loss of smell, attended with a sensation of fulness or obstruction in some particular part of the nose, very similar to what is experienced from the stuffing of the nostrils in a common cold or catarrh. This continues to increase, till a small tumor or excrescence is perceived in one, and sometimes in both nostrils; which in some instances never descends farther than to be merely perceptible on looking into the nostril; while in others it falls down upon the upper lip, and at the same time perhaps pushes back into the throat.

In some, this elongation of the tumor continues steady and permanent, while in others it retracts altogether within the nostrils in dry weather, and protrudes only in rain, or in thick hazy weather. Indeed, the influence of weather on the size of these excrescences is often astonishing. I have known some patients who in clear dry weather were not known to labour under the disease, in whom the tumors protruded

truded to a conſiderable length on the leaſt tendency to moiſt weather.

Theſe tumors are of various degrees of firmneſs. In a great proportion of caſes they are ſoft and compreſſible, but in others ſo firm as to be equally hard with cartilage: All kinds of them are apt to bleed on being fretted or roughly handled; but it is the ſoft ſpongy kind only that are ſo remarkably affected by changes of weather.

The colour of theſe tumors is likewiſe variable: For the moſt part they are ſomewhat pale and tranſparent, but in ſome inſtances they are of a deep red; and, ſo far as I have yet had opportunities of obſerving, I would ſay, that there is ſome connection between their colour and texture. The experience of others may lead to a different concluſion; but in the courſe of my obſervation it has uniformly happened, that the ſoft compreſſible polypus has been of a pale complexion, while thoſe of a firmer texture have always been of a deep red.

In

In the commencement of polypus, the pain is always inconsiderable; and in the softer kinds of it there is seldom much pain, even in its most advanced stages. But polypi of a harder nature become painful as they increase in size, particularly on any cause of irritation being applied to them. In some instances they become unequal and ulcerated over their whole extent. In this state, considerable quantities of a thin fetid matter are discharged; and if a cure be not obtained by extirpation, they are now very apt to degenerate into cancer. It is proper, however, to observe, that it is the firm fleshy kind of polypi only that are apt to become cancerous, and that this change rarely or never happens with those of a soft texture.

But although the softer kinds of polypi seldom end in cancer, and are rarely productive of much inconvenience in their early stages, or as long as they are confined to either of the nasal cavities; yet when more advanced, they are often attended with much distress. Besides the trouble

trouble ariſing from their falling down upon the lip, they ſometimes paſs ſo far back into the fauces, as not only to impede deglutition, but to obſtruct reſpiration; and in ſome inſtances they become ſo large, as not only to diſtend the ſofter parts of the noſtrils, but to elevate and even to ſeparate and diſſolve the firm bones of the noſe. This, indeed, is not a common occurrence; but every practitioner muſt have met with it, as I have done in different inſtances.

Various opinions are met with in authors of the cauſe of polypi. By ſome they are ſaid to ariſe moſt frequently from ſcrofula; while others imagine, that they proceed moſt frequently from lues venerea.

I will not ſay that polypi do not occaſionally occur along with the venereal diſeaſe and ſcrofula. They may even be met with as ſymptoms of theſe diſeaſes. But in ſuch inſtances I would conſider the general diſeaſe of the ſyſtem in no other light than as an occaſional or exciting cauſe of the

the local affection, for in almost every case of polypus a local injury may be traced as the cause of it; and from every circumstance relating to the disease, I conclude, that it is always local and circumscribed. For even where a polypus originates from lues venerea, this particular symptom is so far of a local nature, that it remains fixed and permanent after the general taint of the system is removed. Nor is it acted upon by any quantity of mercury that is given.

All the harder kinds of polypi may probably originate from the same causes which produce tumors of a similar texture in other parts of the body; but in most instances they appear to be connected with, and even to proceed from, a caries of the bone beneath; and it is this chiefly which renders them more hazardous, and of more difficult cure than those that are soft, which, in general, I conceive to be produced by a mere distention or relaxation of the membrana Schneideriana. When any portion of this membrane becomes inflamed,

either by the effects of cold or from external violence, if in this ſtate any part of its ſurface is ruptured or eroded, as frequently happens from picking or blowing the noſe too forcibly, a degree of weakneſs or relaxation is produced, that is apt to terminate in a fulneſs or prominency of the injured parts; and this being increaſed by every ſucceeding cold, the diſeaſe we are now conſidering comes in this manner to take place.

The further progreſs of the diſeaſe may depend on various cauſes; but in general it will advance quickly or ſlowly, according as the parts affected are more or leſs liable to inflame. Thus I have known various inſtances of polypi remaining ſmall and ſtationary for a great number of years, when the patients have not been much expoſed to the open air; while in poor people, who are expoſed to every inclemency of weather, and who are therefore more liable to frequent returns of catarrh, they advance with more rapidity.

In

In the treatment of every diſeaſe, it is a point of importance to be able to form a juſt prognoſis, not only of the manner in which the ſymptoms may probably terminate, but of the effects which may reſult from the remedies that are to be employed for them; and in no inſtance is this more deſirable than in polypous excreſcences of the noſe.

By ſome we are led to conclude, that polypi are always doubtful with reſpect to their termination; that for the moſt part they are even of a dangerous nature; and therefore that we ſhould conſider every perſon in whom they occur as in a ſtate of hazard: Whilſt others aſſert, that although they may occaſionally excite ſome inconvenience, yet that they are ſeldom or never attended with riſk.

Some, again, are ſo timid in the treatment of polypi, as to ſuppoſe that they ought never to be touched; and allege, that there is more chance of rendering them worſe than better, by any operation we can adviſe for removing them; whilſt

by others we are told, that they may be taken away with ſafety.

This difference of opinion in regard to the nature of polypi, and of the effects of the remedies employed for them, has ariſen in a great meaſure from authors not having diſtinguiſhed the different kinds of theſe excreſcences with ſuch preciſion as they ought to have done: For while in one variety of the diſeaſe there is little riſk to be dreaded, and no great cauſe to doubt of our being able to remove it; in others, there is undoubtedly much hazard, and great reaſon to fear that no remedies whatever will prevent a return of it.

I have already obſerved, that polypi are of various degrees of firmneſs; and all the obſervation that I have been enabled to make of them, has led me to conclude, that in general the riſk with which they are attended, is nearly in proportion to their firmneſs. The ſoft compreſſible polypi are not only leſs painful than the others, but may at any time be removed with more ſafety. They are not uſually indeed

indeed attended with pain; and it seldom happens that any material inconvenience occurs from their extirpation: But the firm fleshy kind of polypi are in general not only painful, but more apt to return after being extirpated. In forming an opinion, therefore, of the probable event of polypi, this circumstance of texture deserves particular consideration. In a soft compressible polypus, if the patient is healthy, we may in every instance give a favourable prognosis; for as long as the tumor is of moderate size, it seldom proves troublesome, and therefore ought not to be meddled with; and again, when, by acquiring additional bulk, its removal becomes necessary, it may always be advised with probable hopes of success. But, on the contrary, in polypi that are fleshy, and especially when of a firmer texture than this, the patient or his friends ought always to be informed of the risk being considerable: For it frequently happens that they cannot be entirely removed; and even when this is easily and completely practicable, they are apt to regene-

rate, and in ſome inſtances, as I already obſerved, to end in cancer. In all ſuch caſes, therefore, a guarded prognoſis ſhould be given; otherwiſe, if the diſeaſe ſhould afterwards return, the operator would be juſtly blamed, while the operation itſelf would fall into diſcredit.

Indeed ſome practitioners are ſo averſe to this operation in all caſes of firm or hard polypi, that they always decline to adviſe it. As long as they remain ſtationary, and do not give pain, if they do not obſtruct breathing or deglutition, they ought not to be touched: But whenever they become painful, eſpecially when they have acquired ſuch a bulk as to obſtruct either the paſſage to the ſtomach or lungs, we ought certainly to endeavour to extract them, if this be not already impracticable by their adhering through the whole of their extent to the bones of the noſe, and by these being rendered carious; which, in the late ſtages of the diſeaſe, is very frequently the caſe.

All

All the ſofter kinds of polypi, which are liable, as I have already deſcribed, to be affected by the ſtate of the weather, may frequently be prevented from becoming large by the uſe of aſtringent and eſcharotic applications, particularly by a ſtrong ſolution of alum or white vitriol, the powder of calcined alum, a decoction of oak-bark, or the application of vinegar or ardent ſpirits. By one or other of theſe being applied from time to time over the ſurface of the tumors, I have known different inſtances of their increaſe being checked for a great length of time; and, in ſome caſes, where the remedy has been freely employed, they have at laſt ſhrivelled and become leſs. It muſt be acknowledged, however, that eſcharotics ſeldom or never accompliſh a cure; but it is a matter of no ſmall importance, our being able, by gentle means, to render any painful operation unneceſſary.

On the firſt appearance, therefore, of a polypus, we ought, by a free uſe of ſome aſtringent or eſcharotic application, to en-

endeavour to prevent its farther increaſe; but when this does not ſucceed, we are to conſider by what mode the tumor may be moſt effectually removed.

Various methods have been propoſed for the removal of polypi:—Namely, the uſe of cauſtic or corroding applications;—the actual cautery;—the paſſing of a ſeton or cord through the diſeaſed noſtril;—exciſion with a ſcalpel or ſciſſars;—the application of a ligature round the neck of the tumor;—and evulſion, or extraction by a proper application of forceps.

An ignorance of the circulation of the blood, and of the eaſy method with which we are now acquainted of putting a ſtop to hemorrhagies, led in earlier times to the practice of removing tumors wherever they were ſeated, by corroſive applications, and even by the uſe of the actual cautery. If this practice was conſidered as neceſſary in other parts of the body, it is not ſurpriſing to find it propoſed for the removal of polypi in the noſe, where the effect of hemorrhagies was more dreaded. Cauteri-

ſing

sing irons were therefore invented for this purpose, together with metallic tubes for conducting them. But even with the utmost attention the diseased parts cannot be destroyed without injuring the sound. Remedies of this kind are therefore very apt to do harm, so that they are now very generally laid aside; as are likewise all kinds of strong corrosive applications, which are equally liable to uncertainty, by their being apt to spread to the contiguous sound parts of the nose and throat.

As some have imagined that polypi may be removed, by inducing suppuration over their surfaces, it has been proposed to insert a cord of silk or cotton into the diseased nostril, and one end of it being taken out at the mouth, by daily drawing it, and covering that part of it that remains in contact with the tumor, with a slightly irritating ointment, thus to create some degree of inflammation and consequent suppuration over it.

I will readily allow, that in this manner a plentiful flow of matter may be excited;

cited; but it is not probable that this would have much influence on the ſize of the tumor. Till of late, indeed, it was imagined, that the formation of pus is neceſſarily attended with a diſſolution of the ſolid parts in which it occurs. Upon this principle Mr Daran and others endeavoured to explain the operation of bougies in obſtructions of the urethra; and a ſimilar idea ſuggeſted the remedy of which we are now ſpeaking, in polypous excreſcences of the noſe. But it is now known, as I have elſewhere fully ſhewn *, that the diſſolution of ſolid parts is by no means neceſſary for the formation of pus. It is alſo known, that in diſeaſes of the urethra, bougies prove effectual only by their form, and by the preſſure which they produce; and I have no difficulty in ſaying, that it is in this manner only, by which a cord, if it ever proves uſeful, can have any effect on polypi of the noſe. As the paſſage of the noſtrils is very unequal, being wider in one part than another, and as the roots of polypi

* *Vide* Chapters I. and III.

lypi are frequently ſo ſituated that no preſſure can be applied to them, I am not of opinion that they can ever be removed by the action of a ſeton paſſed through the noſe, as many have imagined. But after the extirpation of polypi in the manner I ſhall hereafter point out, if their roots are not entirely removed, ſome advantage may be derived from our endeavouring in this manner to clear the paſſage more completely. It was for this purpoſe ſolely, I may remark, that the practice we are now conſidering was firſt propoſed by that judicious obſerver Monſieur Le Dran. But although it might, in this manner, ſometimes prove uſeful, yet from being troubleſome in the application, it has ſeldom been employed. We ſhall have occaſion, however, in a ſubſequent part of this ſection, to ſpeak of it again.

In other parts of the body, the removal of tumors by exciſion is univerſally preferred to every other method; and it would likewiſe be ſo in polypi of the noſe, were it not for their inacceſſible ſituation. We

ſeldom

ſeldom indeed find them ſituated ſo as to render this mode of treatment practicable; for although ſcalpels and ſciſſars of various forms have been invented for this purpoſe, the roots of polypi are in general ſeated ſo high in the noſtrils, and the paſſage is for the moſt part ſo completely filled by the tumor itſelf, as to render it always difficult, and often impoſſible, to remove them by exciſion.

But when it is found that the tumor riſes in the under part of the noſtril, and when the point of a ſcalpel can eaſily reach the root of it, we ought, without heſitation, to employ this method of taking it away, even in preference to that by ligature: For in this manner the whole of the tumor may be more effectually removed; and in this ſituation, there is no reaſon to be afraid of hemorrhagies, as compreſſion can be readily applied to any bloodveſſel that may be cut in the under part of the noſtrils. We rarely find, however, as I have obſerved already, that a polypus is ſeated ſo far down in the noſtrils as

as to render this method of treatment practicable.

It therefore appears, that all the means we have yet considered for the removal of polypi in the nose, are either inadequate to the effect, or altogether inadmissible; and hence we are obliged to employ either the method by ligature, or that by extraction with the forceps.

As the removal of polypi by tearing or twisting them off, is attended with much more pain than the application of ligatures round their necks, the latter would always have been preferred, if it had been considered as equally practicable. And as we now know that it can be done in a very safe and easy manner, it will probably in future be very generally employed. The method to which I allude, is that which Monsieur Levrette of Paris first recommended, for the removal of polypi in the vagina, and which we now find may be used with equal propriety in polypi of the nose and throat. The following is the method of applying it in the throat.

Fig.

Fig. 1. Plate XXXI. repreſents a piece of pliable ſilver wire paſſed through a double canula; the wire being ſufficiently long when doubled to admit of its paſſing through the noſe in the pharynx. Let the wire be taken from the canula, and the doubling at the end of it be ſlowly and gently inſinuated through one of the noſtrils: As ſoon as it appears in the throat, the operator, with his fingers inſerted into the mouth, muſt open the double ſufficiently for paſſing it over the pendulous extremity of the tumor; and having preſſed it down to the neck or root of it, the two ends of the ligature hanging out at the noſtril muſt be again paſſed through the canula; which is now to be puſhed back along the courſe of the wire, till it comes in contact with the root of the polypus. The fingers ſhould ſtill be continued in the throat, to retain the ligature at the root of the tumor; and the canula being placed in the manner I have adviſed, the wire muſt be drawn tight; and the ends of it being fixed on the wings or handle of the canula,

nula, as in Plate XXXII. fig. 1. it must be left in this situation till the following day, when being again drawn somewhat tighter, and this being daily repeated, the tumor will fall off sooner or later, according to its size. When small, it sometimes drops off in the course of the second day; and tumors even of a large size often come away on the third or fourth. It is better, however, to make the compression more gradual; for, when the wire is drawn with much force, instead of acting as a ligature, and removing the tumor by compression, it removes it too quickly, by cutting it across, and may thus be equally productive of hemorrhagies, as if the operation had been done with a scalpel.

In this manner, all those polypi may be removed, which either originate in the throat, or that proceed back from the nostrils into the fauces; and the practice may be extended even to those that are deeply seated in the pharynx, if the ligature can be properly applied over them, either with the fingers, with the assistance

of

of forceps, or with an inſtrument, ſuch as is delineated in Plate XXXIII. fig. 3. Some inſtances, indeed, have occurred, of excreſcences ſeated too deep in the œſophagus, for admitting of ligatures being uſed in this manner; nor is it admiſſible even where the upper part of the tumor is acceſſible, if the baſe or neck of it be ſo low down as to prevent the ligature from being applied to it. In the Third Volume of the Phyſical and Literary Eſſays of Edinburgh, there is a caſe related, in which a very ingenious method was put in practice by the late Mr Dallas, for ſurrounding deep ſeated polypi with ligatures; and although inſtances of ſuch excreſcences are rare, yet, as they are ſometimes met with, I think it right to give a delineation of the inſtrument which in this inſtance was ſucceſsfully employed.

In this caſe both breathing and deglutition were impeded by a large fleſhy excreſcence in the œſophagus, a conſiderable portion of which was thrown into the mouth, by every exertion to vomit; but it ſoon

soon retracted and remained concealed within the pharynx till vomiting or retching was again excited. This portion of the tumor, which occasionally protruded, was removed by the method to which I allude, and which I have more particularly described in the explanation to Plate XXXIV. The patient was in this manner relieved from much inconvenience and distress; but another branch of the tumor that extended towards the stomach, becoming afterwards very large, he died of the effects of it in about two years from the operation.

I think it right to remark, that this patient might probably have been saved by the use of the ligature and double canula, such as I have described, and that in similar cases it is to be considered as perhaps the best means of relief. When a polypus is suspected to have formed in the œsophagus, if no part of it is observed to protrude into the pharynx, there will be much cause to imagine that it proceeds down towards the stomach; so that, if

the double of a piece of flexible wire be puſhed down the œſophagus, the pendulous part of the tumor may be laid hold of in withdrawing it; or, if one attempt ſhould fail, other trials may ſafely be made with it: And as ſoon as the double of the ligature is found to be firmly fixed, all that portion of the tumor which it ſurrounds may be eaſily removed by the application of the double canula, in the manner I have adviſed. It is proper, however, to obſerve, that the ligature and canula ſhould both be carried through one of the noſtrils into the œſophagus; for in this manner they will not prove ſo troubleſome as when paſſed through the mouth, and they may be applied with equal eaſe and advantage. For this purpoſe the canula muſt have a ſlight degree of curvature, as is repreſented in Plate XXXI. fig. 2.

In a great proportion of caſes, ligatures may be applied round polypi of the back part of the noſe and throat, in the manner I have adviſed, and without interrupting reſpiration; but when deeply ſeated in the

œſophagus,

œſophagus, and on all occaſions when the application of the ligature is difficult and tedious, it is proper to ſecure an eaſy and free reſpiration during the operation, by previouſly adviſing bronchotomy. By this no additional riſk is incurred, for it may with eaſe and ſafety be accompliſhed; and it puts it in our power to finiſh the operation more perfectly than we otherwiſe could do. It is likewiſe proper to remark, that although the operation may often be done without any aſſiſtance from a ſpeculum oris, yet, whenever it proves tedious, and when the ligature cannot be eaſily applied, this inſtrument ſhould be employed.

I have now to mention the method of applying a ligature to a polypus ſeated in the anterior part of the noſe, and which, inſtead of paſſing back into the pharynx, proceeds down one of the noſtrils towards the upper lip. Let the double of the ligature be paſſed over the moſt depending part of the polypus, and be ſlowly puſhed up to the root of it with the ſlit probe,

Plate XXXIII. fig. 2. The probe being given to an aſſiſtant to preſerve the ligature in this ſituation, the two ends of it muſt be paſſed through a double canula; which being inſerted into the noſtril on the oppoſite ſide of the polypus, and being puſhed eaſily along till it reaches the root of it, the ligature muſt now be drawn ſo tight as to make ſome impreſſion on the root of the tumor, when the ends of it muſt be tied to the wings of the inſtrument, and daily pulled ſomewhat tighter, till the tumor drops off.

In this manner almoſt every polypus in any part of the noſe may be extirpated. Thoſe who have not ſeen it put in practice, may be apt to doubt of this aſſertion; but a few trials will ſhew that it is not only the moſt effectual method, but the ſafeſt and eaſieſt that has yet been propoſed for removing polypi of every kind: It alſo has the advantage over every other method of applying ligatures upon polypi in the noſe, of anſwering equally well in the large as in the ſmaller kinds of them; and it may even

even be applied where the tumor is ſo large as to diſtend the noſtril to a conſiderable ſize. In Plate XXXIII. fig. 1. there is delineated a remarkable form of a polypus extirpated in this manner, under the direction of Dr Monro, who was the firſt, I muſt obſerve, who put in practice this method of removing polypi from the noſe and fauces. This polypus filled the noſtril completely; to ſuch a degree, indeed, that it could not have been removed in any other manner; not even with forceps, for the blades of the inſtrument could not have been inſerted.

Beſides this, another method has been propoſed of applying ligatures round polypi in the noſtrils: By introducing a ligature through the noſtril in which the tumor is ſeated, puſhing it back to the throat, and paſſing it in ſuch a manner, that the doubling may include the root of the polypus, if the oppoſite ends of it be taken out at the mouth, they may be ſufficiently twiſted, it is alleged, for removing the tumor.

In a few caſes this might poſſibly anſwer, but it would often fail: I think it right, however, to mention it, from its being recommended by a very judicious practitioner, Mr Cheſelden. Fig. 2. Plate XXXII. exhibits a repreſentation of a polypus ſurrounded with a ligature in this manner.

Various forms of forceps have been invented for the purpoſe of removing polypi. Thoſe that anſwer the intention beſt, and now moſt generally uſed, are repreſented in Plate XXXV. Thoſe of a ſtraight form are intended for extracting polypi by the anterior nares, and the crooked forceps are employed by ſome for the removal of thoſe excreſcences which paſs into the throat behind the uvula. I have ſhewn indeed that polypi of this kind may be more eaſily removed with ligatures, but I think it right to delineate ſuch forms of forceps as are uſed by thoſe who prefer a different method.

In proceeding to extract a polypus with forceps, the patient ought to be firmly ſeated,

seated, with his head leaning back, and supported by an assistant behind; and as it is of much importance, our being able to discover, as nearly as possible, the origin of the excrescence, some advantage may be obtained from the face being placed in such a manner that the light of a clear sun may fall into the nostril.

In the ordinary method of performing this operation, the surgeon now takes the forceps, fig. 2. Plate XXXV. and inserting one of the blades on each side of the polypus, he carries them easily along till he brings their points as near as possible to the neck of it, when he lays hold of it firmly, and endeavours to extract it entire, either by pulling directly downwards, or by moving the forceps from one side of the nostril to another; or, as some more properly advise, by turning or twisting the polypus round, till it is completely separated. By this last method I think it probable, that the root or attachment of the excrescence will be more readily loosened than in any other way, at the same

time that that part of the lining membrane of the noſe will not be ſo much injured as when the tumor is torn away by being pulled either laterally or in a perpendicular direction downwards.

When a polypus is of a firm texture, if the operation is properly conducted, we may frequently be able to bring it all away at once: But when ſoft and yielding, it commonly requires repeated applications of the forceps; and we ſhould never deſiſt, as long as any portion of it remains that can with propriety be removed.

It is proper, however, in this place, to obſerve, that the firſt application of the forceps is commonly attended with the diſcharge of ſo much blood, that beginners are apt to deſiſt before the operation is nearly finiſhed, from their being afraid of fatal conſequences from the hemorrhagy; but this ought not in general to be regarded, as long as, by a farther uſe of the forceps, we can extract any more of the polypus. And even when the operation is finiſhed, if the patient is in any degree plethoric,

plethoric, some advantage may ensue from a farther discharge, by which inflammation may be prevented, which otherwise might produce very troublesome consequences. Profuse hemorrhagies from this operation seldom happens; by no means so frequently as those are apt to imagine who have not often had occasion to practise it. I will not pretend to say that instances may not occur of more blood being lost by it than is proper; but I can safely assert, that it is not a common occurrence. When it is found, however, that the hemorrhagy is proceeding too far, we should immediately employ those means that we know from experience are most effectual in putting a stop to it; but these having already been fully considered in Section III. of this Chapter, it is not necessary to enter upon them at present.

As it sometimes happens that part of the roots of polypi are not extracted by the forceps, we are desired by some practitioners to destroy them, by inserting caustic or corrosive applications into the nostrils

noſtrils immediately after the operation. Unleſs, however, we can evidently obſerve the ſpot on which the cauſtic ſhould be applied, I am clearly of opinion that this practice ſhould not be adopted; otherwiſe we muſt work entirely at random, and will more probably do harm than good. But when, by expoſing the noſtril to a clear light, we can bring the ſeat of the excreſcence into view, we may with propriety touch any parts of it that remain with lunar cauſtic, properly covered with a canula, in order to protect the contiguous ſound parts. An inſtrument for this purpoſe is repreſented in fig. 1. Plate XXXIV. This, however, ſhould not be attempted on the day of the operation, as is commonly adviſed; for while any diſcharge of blood continues, a clear view of the parts cannot be obtained: But it may with propriety be done on the following day; and the cauſtic ſhould be repeated every ſecond or third day, as long as any remains of the excreſcence are obſerved.

When,

When, again, the root of a polypus lies so deep that it cannot be discovered, if we find, either by the introduction of a probe, or by the breathing through the nostril not being free, that the excrescence is not entirely removed by the forceps, although, for the reasons I have mentioned, caustic should not in this situation be employed, it may be highly proper to destroy it by means of a more harmless nature. In this case, the practice I have described, of passing a seton through the nostril into the throat, might sometimes answer, but the frequent application of large bougies succeeds with greater certainty. In one of the following Chapters I shall have occasion to remark, that in the removal of obstructions in the urethra, bougies seem to operate chiefly by mechanical pressure; and there is cause to imagine, that upon the same principle they may be employed with advantage for the removal of those parts of polypous excrescences in the nostrils that cannot be taken away with the forceps. Nay more, were

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we conſulted early in the diſeaſe, before the excreſcences have become large, they might, I think, be ſucceſsfully employed in preventing their further increaſe; and if duly continued, they might, in ſome inſtances, in this incipient ſtate of the diſeaſe, remove them entirely. Practitioners, however, are ſeldom adviſed with, till the diſeaſe has gone too far to admit of this. I have only had one opportunity of trying it; but in this caſe, the effects of it were ſuch as to juſtify our putting it to the teſt of future experience.

This was the opinion that I publiſhed of this remedy ſeveral years ago, and ſince the firſt editions of this work were printed, I have had many opportunities of putting it to trial. In all it gives great relief, by enabling the patient to breathe more eaſily through the noſe, and in ſome it has entirely removed the diſeaſe. It is not, however, the common bougie that I employ, but a piece of bougie plaſter rolled up into a flat form, nearly of the breadth and thickneſs of the forefinger of

of an adult; and of a length to pass into the pharynx, while half an inch or thereby remains out of the nostril. The plaster should be of a firm consistence; the bougie perfectly smooth; and if well covered with oil, it may be easily passed, even where the excrescence is so large as to fill a considerable part of the nostril: The patient is soon able to insert it himself, and by doing it every night at bedtime, and withdrawing it in the morning, it gives him little trouble in the application, while it commonly soon affords relief to the state of his breathing.

The person in whom this mode of treatment was first employed, had for several weeks complained of a kind of stuffing, and interruption to breathing in one of his nostrils. On looking into it, I clearly saw and touched with the probe, a small, pale coloured, soft polypus, at a considerable depth. As it did not yet produce much inconvenience, I did not think of advising it to be extracted; but considering it as a fit case for trying the effects

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of compreſſion, a roll of bougie plaſter was paſſed into the noſtril; and being gradually increaſed in ſize, the paſſage at laſt became clear and pervious; and in the courſe of ſeven or eight weeks, the excreſcence diſappeared almoſt entirely: But the patient was at this time obliged to go abroad, and I have not ſince that period heard of him.

In the latter part of the treatment of this caſe, a ſilver tube covered with plaſter was employed; by which the breathing went freely on; and being of ſuch a length as to paſs into the pharynx, it was eaſily kept inſerted, and was prevented from falling out, or from paſſing back to the throat, by a piece of adheſive plaſter, connected with it by means of a ſtrong thread being applied acroſs the upper lip.

In deſcribing the operation of extracting polypi, I have ſuppoſed that the forceps in common uſe are to be employed; and when the excreſcence is ſmall, they anſwer the purpoſe as well as any other: But

But when the polypus is so large, as nearly to fill the nostril, they cannot be either easily or properly applied: For the two blades of the forceps being both introduced at once, they cannot but with much difficulty be pushed deep into the nostril already much obstructed; and the more they are pressed forward upon the excrescence, and the nearer the end of it is brought to the axis of the instrument, the more widely the blades of it are necessarily opened at their extremities; by which the tumor cannot be so equally compressed, nor is there such a chance of extirpating the root of it by means of them, as if they were so constructed as to apply pressure equally through their whole length.

To remedy these inconveniencies, several improvements have been proposed; but the best that I have met with is one by the very ingenious Dr Richter of Gottingen. A representation of it is given in Plate XXXV. fig. 3. This instrument may be used in the ordinary way, by introducing

troducing both blades at once, when the polypus is ſmall; but when the tumor is large, it anſwers better to introduce the blades ſeparately, as is done with midwifery forceps. One of the blades being carried ſlowly and cautiouſly forward along the courſe of the polypus, the other muſt in like manner be introduced at the oppoſite ſide of it, ſo that they may now be firmly locked together at the joint. The blades are accordingly made to ſeparate eaſily, and to fix in ſuch a manner, as to admit of their being employed in the way that I have mentioned.

Theſe, and every other variety of forceps employed for this operation, ought to be as thin and ſlender in that part of them which is inſerted into the noſe, as the nature of the diſeaſe will admit; for I muſt again obſerve, that the ſtraitneſs of the part in which the inſtrument muſt move, is one of the principal difficulties we have to encounter. But when the forceps are made of well-tempered ſteel, they need

need never be so thick and bulky as they are commonly made.

When, however, polypi have acquired a large size, the obstruction they produce in the nostril is in some instances to such a degree, that no forceps can be inserted: In such circumstances, as a considerable space may be gained by laying the nostril open, it may in some instances be proper to divide the cartilaginous part of it by a longitudinal cut; and, after extracting the tumor, to reunite the divided parts either by adhesive plasters, or with one or more sutures.

In mentioning this, however, I think it right to observe, that it is a measure which ought not in any instance to be hastily adopted; but I also think, that it should not be universally condemned, as we find it to be by some practitioners. I do not imagine that it would in every case prove successful: But when a polypus has already become so large as entirely to fill the nostril; when, therefore, no forceps can

be inſerted for removing it; when the tumor is ſtill continuing to increaſe; and when of courſe there is much reaſon to ſuſpect, that it may terminate fatally if it be not extracted; it will ſurely be better to give the patient any ſmall chance that may be derived from the practice I have propoſed, than to leave him to die in miſery, which in all probability he would do were no attempt made for his relief. If, on laying the noſtril open, it is found that the tumor can be with ſafety removed with forceps, a complete recovery may poſſibly be obtained; and thus the pain that the patient has ſuffered, and the trouble of the operator, will be amply rewarded, whilſt no material injury will be done, nor any kind of riſk incurred, if, on laying the parts open, it is unfortunately found, that no part of the tumor can with propriety be taken away.

In the firm fleſhy kind of polypi, which in ſome inſtances degenerate into cancer, when it is found that the tumor is already

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in a ſtate of ulceration, and that the contiguous cartilages and bones of the noſe are diſeaſed, it would no doubt be imprudent to adviſe the treatment I have mentioned, for no advantage would probably accrue from it; the patient would be made to ſuffer a great deal of unneceſſary pain; and the operation itſelf would be brought into diſrepute: but in the ſofter kinds of the diſeaſe, which rarely or never become cancerous, and when the more external bones and cartilages of the noſe are not affected, we ought without heſitation to adopt it, when the tumor, as is here ſuppoſed to be the caſe, is meant to be removed with the forceps, and when this cannot be done in any other manner.

In the caſe of a firm fleſhy excreſcence, which filled the noſtril ſo completely that the forceps could not be introduced for removing it, a method was put in practice by Dr Richter for reducing the ſize of it; which to a certain degree anſwered the purpoſe, and afforded conſiderable

relief. A hole or opening was made through the centre of the excreſcence by puſhing a common trocar through the whole length of it, after being made red hot and covered with a canula. By this means a paſſage was formed through which the patient breathed eaſily, and the tumor was much leſſened; but the Doctor was unfortunately prevented from attempting to complete the cure, either by extraction or otherwiſe, by the patient leaving the place.—This caſe, however, affords an uſeful practical hint, and points out a mode of treatment, which in tumors of this particular kind, may in ſome inſtances be ſucceſsfully employed *.

I have thus deſcribed the method of extracting polypi of the noſe with forceps; but I muſt again remark, that they may

* For a more particular account of this caſe, and of the forceps mentioned above, vide Auguſti Gottlieb Richteri Obſervationum Chirurgicarum faſciculum ſecundum, Gottingæ, 1776.

may be removed both with more eaſe and ſafety with ligatures; and as this mode of operating is admiſſible in a great proportion of caſes, it ſeems only to require to be more generally known, to be very univerſally preferred.

SECTION VI.

Of Extirpation of the Tonſils.

THE Amygdalæ or Tonſils are frequently, even in a natural ſtate, ſo large as almoſt to fill up the paſſage from the mouth to the throat. As long, however, as they remain ſound, and are not attacked with inflammation, any inconvenience that they produce is ſeldom of much importance: But tonſils of this enlarged ſize are very apt to inflame on the patient being much expoſed to cold; and frequent returns of inflammation are often attended with ſuch an addition of bulk, as to produce nearly a total obſtruction to the paſſage of food, drink, and air.

It is this enlarged ſtate of the amygdalæ that in general is termed a ſchirrous ſtate of the Tonſils; but I think it right to obſerve,

ſerve, that the term Schirrous appears here to be very improperly applied; for, excepting the circumſtance of a firm tumor, every other characteriſtic of ſchirrus is here very commonly wanting. A real ſchirrus is attended with frequent ſhooting pains, and it very commonly terminates in cancer: Now we know, that pain very ſeldom occurs in caſes of enlarged tonſils, except from inflammation: While in an inflamed ſtate, they are frequently indeed very painful; but as ſoon as the inflammation ſubſides, no more pain is experienced, and they remain perfectly eaſy and indolent till the patient is again expoſed to cold. This, however, is never the caſe with ſwellings of the real ſchirrous kind; for whenever they become painful, they uniformly proceed to turn worſe: And, again, enlarged tonſils are ſeldom or never known to terminate in cancer. I never knew an inſtance of their doing ſo; and few practitioners, I imagine, have met with it.

Mr Sharpe, when treating of this ſubject, recommends a more frequent extirpa-

tion of enlarged, or what he terms Schirrous Tonſils, than what has hitherto commonly prevailed; and he is induced to do ſo, from having obſerved that the diſeaſe never returns, as it too frequently does after the extirpation of ſchirrous tumors in other parts. His words being much in point, I ſhall tranſcribe them. "All other tumors of the ſchirrous kind, whether of a ſcrofulous or cancerous nature, are ſubject to a relapſe; the poiſon either remaining in the neighbourhood of the extirpated gland, or at leaſt falling on ſome other gland of the body. In this caſe, I have never met with one ſuch inſtance; and the patient has always been reſtored to perfect and laſting health *."

Mr Sharpe has here communicated a very intereſting fact; the more valuable, by coming from a man of high reputation, and whoſe practice was very extenſive. By many, however, the truth of his aſſertion has been doubted, from its being univerſally

* Vide Critical Inquiry, &c. by Samuel Sharpe.—Fourth Edition, ſect. vii.

verſally known that ſchirrous tumors frequently return in other parts of the body after being extirpated. It would indeed be ſurpriſing to find the extirpation of ſchirrous tonſils prove always ſucceſsful when the ſame operation often fails when practiſed for ſimilar affections in other parts. But the explanation I have given, ſets it in a more diſtinct point of view. Theſe tumors of the amygdalæ, commonly termed Schirrous Tonſils, are not of the true ſchirrous nature; and hence it is, that they never degenerate into cancer, nor return after extirpation; and this is accordingly a very weighty argument for removing them as ſoon as they become ſo large as to impede either deglutition or reſpiration. Till this, however, takes place to a conſiderable degree, no practitioner ought to adviſe this operation; for, as it is attended with a good deal of pain, it ſhould be avoided as long as the ſafety of the patient does not require it; but whenever the tumor becomes ſo large as to produce much interruption to the paſſage of food

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and air, we ſhould not heſitate to adviſe it.

Different methods have been propoſed for removing enlarged tonſils.—Some have adviſed the repeated application of the actual or potential cautery: Others recommend exciſion with the ſcalpel or crooked ſciſſars: And, laſtly, it has been propoſed to do the operation with ligatures.

Cauſtic, however, ſhould here be conſidered as inapplicable, from the impoſſibility of uſing it without injury to the neighbouring parts; and we are debarred from the uſe of the knife and ſciſſars by the profuſe hemorrhagies that ſometimes occur from exciſion. Neceſſity, therefore, obliges us to employ the ligature; and with due attention, almoſt every tumor may be removed by means of it with which the amygdalæ are attacked.

In the laſt ſection I have given a detail of the beſt method of applying ligatures to polypous excreſcences in the throat, and it likewiſe appears to be the eaſieſt and beſt method of forming ligatures upon tumors

tumors of the amygdalæ. It ought to be done with pliable silver-wire, but catgut of a proper strength will likewise answer; and although the double canula to be passed through the nose might be of a straight form, it will answer better if somewhat crooked, as in fig. 2. Plate XXXI.

The double of a ligature, formed of pliable silver-wire or catgut, being inserted into one of the nostrils, must be pushed back till it reaches the throat, when the operator, introducing his fingers at the mouth, must open the ligature; and having passed it over the tumor, it must now be pressed closely down to the root of it. In this situation, he must continue to preserve it with his fingers; while an assistant having inserted the two ends of the ligature into the canula, must push it easily into the nostril, till the farther end of it is either seen or felt in the throat; and the wire being now pulled so tight as to fix it in the substance of the tumor, the ends of it hanging out at the other end of the canula must be tied in the manner pointed

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out in the laſt ſection, to the wings or handle of the inſtrument; and the ligature being made tighter from time to time, the ſwelling will ſoon fall off.

The more pendulous the tumor is, the more eaſily will the ligature be fixed. But however broad the baſe of it may be, it may with little difficulty be done; for the ſwelling is always prominent: So that when the double of the wire is fairly paſſed over, it may eaſily be puſhed down to the baſe with the fingers; and being preſerved in this ſituation till pulled ſufficiently tight, it will not afterwards be in danger of moving.

I have adviſed the ligature to be firſt carried through the noſe before being put over the tumor. It might be inſerted by the mouth; but in this manner more inconvenience would enſue from the ligature and canula hanging out at the mouth during the cure. This method, however, may be tried when any difficulty occurs in applying the ligature by paſſing it through the noſe.

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For the most part we find both tonsils nearly equally enlarged, and in some cases the removal of one of them forms a sufficient opening for the passage of the food; but when it becomes necessary to extirpate both, it answers better to allow the inflammation and tension induced by the removal of the first, to subside entirely before attempting to remove the other.

This mode of applying ligatures upon these tumors, is in my opinion the best; but it may often be done in a different manner. Let a ligature sufficiently strong be formed of waxed thread, and carried round the tumor either with the fingers or a split probe, such as is represented in Plate XXXIII. fig. 2. A noose is now to be made on it, by which a knot of any degree of tightness may be tied, by fixing one end of the thread at the side of the tumor in the throat, with the instrument, fig. 2. Plate XXXVIII., while the other is firmly drawn with the other hand of the surgeon out of the mouth.

This

This method was firſt put in practice by Mr Cheſelden; and ſince that period by Mr Sharpe and others. Where the tumor has a broad baſe, in order to fix the ligature, a needle with an eye near the point, ſuch as is repreſented in Plate XXXVIII. fig. 3. was likewiſe propoſed by Mr Cheſelden. A double ligature being put into the eye of the needle, the inſtrument is puſhed through the centre of the tumor near to its baſe, and the threads being diſengaged with a pair of forceps, the needle is withdrawn. In this manner two ligatures are to be formed, each of them being made to comprehend one half of the tumor by one of the threads being tied above, and the other below.—The inſtrument, fig. 2. of the ſame Plate, is likewiſe neceſſary here.

Although it is proper to mention this method of fixing ligatures upon tumors of the tonſils with broad baſes, it will not probably be often employed. The double canula renders it unneceſſary, as we can apply, by means of it, ſuch a degree of force

force as will at once fix the ligature in the substance of the swelling: Even when the operation was done in a manner that did not admit of the ligature being so firmly fixed as may be done with the double canula, Mr Sharpe was of opinion, that Mr Cheselden's method of performing the operation was unnecessary. His observation on this point is, "That he had never in one instance found it necessary to employ the double ligature recommended by Mr Cheselden *."

By whatever method, however, the operation is performed, the tumor will not in every instance fall off by the first ligature; in which case, another must be applied, and continued till a cure be obtained.

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* Vide Mr Sharpe's Treatise on the Operations of Surgery, Chapter xxxii.

SECTION VII.

Of the Extirpation of the Uvula.

THE Uvula, by frequent attacks of inflammation, as likewiſe from other cauſes, becomes in many inſtances ſo relaxed and elongated, as to excite much diſtreſs, not only by impeding deglutition, but by irritating the throat ſo as to induce cough and retching.

Slight degrees of enlargement of this part may in general be removed by the frequent uſe of aſtringent gargles, compoſed of ſtrong infuſions of red roſe leaves,—Peruvian bark,—or oak bark, with a proportion of alum or vitriolic acid; and as long as remedies of this kind anſwer the purpoſe, no others ſhould be adviſed. But when theſe fail, and when the uvula becomes ſo large as to create much diſtreſs, we depend on extirpation alone for a cure.

The

The uvula may be extirpated either with a ligature or by excision. By the last, the parts affected are quickly removed, and the patient obtains immediate relief; whereas the other is not only slow in its operation, but is applied with difficulty. But by excision, troublesome hemorrhagies sometimes occur, while no risk whatever ensues from ligatures. Some practitioners indeed allege that no danger can ensue from any hemorrhagy that takes place from the removal of the uvula by excision; but although this may frequently happen, yet I know from experience that instances of the contrary sometimes occur, and that large quantities of blood have been lost by this operation. This will most readily happen where the uvula is much enlarged, and where of consequence the vessels with which it is supplied are in an enlarged state. Where the uvula is merely elongated, there will seldom, I imagine, be much risk in removing it by excision. In this state, therefore, of the disease, excision should be preferred; but

when the parts to be removed are much increaſed in bulk, it anſwers better to do it with ligatures.

Different inſtruments have been invented for cutting off the uvula. The one that has been moſt frequently uſed is repreſented in Plate XXXIX. fig. 1. But neither this, nor any other of a ſimilar form, anſwers the purpoſe ſo well as a curved probe-pointed biſtoury, ſuch as is delineated in fig. 3. of the ſame Plate. Or the operation may be very eaſily done with ſciſſars of the common form, or with a curve, ſuch as is repreſented in Plate XXXVI. fig. 2.

When any of theſe inſtruments are employed, the mouth being firſt ſecured with a ſpeculum, ſuch as is repreſented in Plate XLI. fig. 1. the uvula ſhould be laid hold of with ſmall forceps, or with a ſharp hook, by which it will be more eaſily cut off than if left looſe in its natural pendulous ſtate. After the operation, if much blood is diſcharged, it may be reſtrained by the uſe of an aſtringent gargle; by the application

application of ardent spirits; or even by touching the bleeding vessel with lunar caustic. It will seldom happen, however, that any precaution of this kind is necessary; for a moderate flow of blood will never do harm, and more than this will rarely occur where the parts are not much enlarged. When, again, a ligature is to be employed, the mode of fixing it described in the last section may be adopted: It may be done by the double canula passed through one of the nostrils;—or the canula may be introduced at the mouth;—or it may be done by the method employed by Mr Cheselden for applying ligatures upon the tonsils, also described in the last section. After passing the ligature round the tumor, which in general will be easiest done with the fingers, a knot may be tied on it in the manner I have there directed, with the instrument, fig. 2. Plate XXXVIII.

I have likewise thought it right to represent another instrument, hitherto almost the only one employed for fixing a ligature upon the uvula, Plate XXXI. fig. 3.

From the name of the inventor, it has commonly been termed the Ring of Hildanus. The invention is very ingenious; and by means of it a ligature may be firmly applied upon the uvula: But the ſame intention may be accompliſhed in a more ſimple manner, by either of the other methods deſcribed above; ſo that this will probably be laid aſide.

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SECTION VIII.

Of Scarifying and Fomenting the Throat.

IT frequently happens in inflammation of the amygdalæ and contiguous parts, that ſcarifications become neceſſary; in the firſt place, for leſſening the degree of inflammation by inducing a topical diſcharge of blood; and afterwards for the diſcharge of matter contained in abſceſſes, when ſuppuration has not been prevented by the means uſually employed for this purpoſe.

In Plate XL. figures 1. and 3. I have delineated different forms of inſtruments for this purpoſe: The wings with which fig. 1. is furniſhed, are meant to compreſs the tongue, while the ſcarificator is employed in the back-part of the mouth. With either of theſe, ſcarifications may be made, or abſceſſes opened, in any part of the mouth or throat with entire ſafety.

In the treatment of inflammatory affections of theſe parts, we often find it neceſſary to recommend fomentations; a remedy which proves alſo uſeful in catarrhal affections of the trachea and lungs. Various methods are propoſed for conveying ſteams to theſe parts; but the beſt that has yet appeared, and it is likewiſe the neateſt and moſt ſimple in its conſtruction, is the inſtrument delineated in Plate XL. fig 2. the invention of Mr Mudge of Plymouth. By means of it, the throat, trachea, and lungs, may be very effectually fomented by drawing warm ſteams into them, and without any difficulty or inconvenience to the patient, who may lie in bed during the whole operation.—This inſtrument I conſider as ſo highly uſeful in the treatment of every caſe of catarrh, that I think every family ſhould have it.

CHAP-

CHAPTER XIII.

Of DISEASES *of the* LIPS.

SECTION I.

Of the HARE-LIP.

NATURAL deficiencies are not ſo frequent in any part of the body as in the lips. Children are often born with fiſſures in one of the lips, particularly in the upper lip. In ſome inſtances this is attended with a want or real deficiency of

parts; in others we only meet with a ſimple fiſſure or diviſion; whilſt in ſome again, there is a double fiſſure with an intermediate portion of the lip between them. Every degree of this affection is termed a Hare-lip, from a reſemblance which it is ſuppoſed to bear to the lip of a hare.

For the moſt part this fiſſure or opening is confined to the lip itſelf: But it often extends back along the whole courſe of the palate, through the velum pendulum and uvula into the throat; and in ſome inſtances the bones of the palate are either altogether or in part wanting, while in others they are only divided or ſeparated from each other.

Every degree of the hare-lip gives much deformity, and it ſometimes prevents a child from ſucking: It is always productive of ſome degree of impediment of ſpeech; and when the diviſion extends along the bones of the palate, the patient is much incommoded both in chewing and ſwallowing, by the food paſſing readily

ly up to the noſe. When in the under lip, which is not often however the caſe, it commonly prevents the ſaliva from being retained.

Theſe are all very urgent reaſons for an early removal of the hare-lip being attempted: Where it interrupts, indeed, the ſuckling of the child, the operation muſt either be done immediately, or the child muſt be fed with a ſpoon; but by practitioners in general, we are deſired at all events to delay the operation to the third, fourth, or fifth year; leſt the crying of the child ſhould render the means employed for obtaining a cure altogether abortive.

This reaſon, however, does not appear to be of importance; for till the child arrives at his twelfth or fourteenth year, when we may ſuppoſe him to be poſſeſſed of ſufficient fortitude for ſubmitting eaſily to the operation, the ſame objection holds equally ſtrong: Nay, a child of ſix or eight years of age is in every reſpect more difficult to manage than one of ſix, eight, or twelve months. I am therefore clearly

clearly of opinion, that in a healthy child the operation ſhould never be long delayed; for the more early it is performed, the ſooner will all the inconveniencies produced by the diſeaſe be removed; and now, after various trials, I find that it may be done even in very early periods of infancy, perhaps in the third or fourth month, with the ſame proſpect of ſucceſs as in any period of life. I have done it in the third month with very complete ſucceſs, but the twelfth or thirteenth anſwers better.

Practitioners all agree in regard to the intention of this operation, which is to cut off the ſides of the fiſſure ſo as to reduce the whole of it to the ſtate of a recent wound, and then to draw them together, and retain them in contact till they unite. But although the principles on which this practice reſts are univerſally admitted, authors are of very oppoſite opinions in regard to the beſt method of carrying it into effect. By ſome we are adviſed to employ the interrupted ſuture for retaining the

ſides

ſides of the fiſſure: Others prefer the twiſted ſuture: Whilſt by many, ſutures of every kind are ſaid to be improper; and that a cure may be always obtained with adheſive plaſters, or bandages; by which means a great deal of pain would no doubt be avoided, which ſutures are always ſure to excite.

This is a point of much importance, and therefore merits particular diſcuſſion; more eſpecially as it has been warmly conteſted even by ſurgeons of reputation.

In the treatment of every diſeaſe, our principal object is to obtain an effectual cure; but every practitioner will allow, that the eaſieſt mode of effecting this ſhould be preferred. On this principle, much pains have been taken to ſhew, that ſutures are ſeldom neceſſary in wounds of any kind, eſpecially in the cure of the hare-lip; and in ſupport of this opinion, various caſes are recited of cures being performed with bandages alone: Nay, ſome have gone ſo far as to aſſert, that in every

every inſtance of hare-lip a cure may be obtained with more certainty with a bandage than by ſutures; for they allege, that the irritation produced by ſutures ſerves in a great meaſure to counteract the very purpoſe for which they are employed. After the edges of the fiſſures are cut off or rendered raw, the contraction of the adjoining muſcles is the only difficulty that we have to encounter; and this, we are told, inſtead of being removed by ſutures, is always increaſed; while the ſame intention, it is ſaid, may be accompliſhed with no inconvenience whatever, by a bandage applied in ſuch a manner as to keep the edges of the ſore in cloſe contact, which it does by ſupporting the contiguous parts ſo as to prevent the reaction of the muſcles with which they are connected.

That a hare-lip may be completely cured with the uniting bandage, or even with adheſive plaſters alone, there is no reaſon to doubt; and being attended with leſs pain than the method of cure by ſutures, it ought in every caſe to be preferred, if

with

with equal certainty it could be relied on: But although with much pain and attention, we might in ſome inſtances be able to accompliſh a cure, with plaſters and bandages; yet, from the nature of the remedy, there is cauſe to imagine that it would frequently fail; for in the cure of the hare-lip, if every point of the parts meant to be united be not kept in contact till complete adheſions take place, our intention is always fruſtrated, and nothing afterwards anſwers the purpoſe, but a repetition of the operation in all its parts. The edges of the ſore muſt be again rendered raw, and the patient muſt ſubmit, either to another application of the bandage, or to the uſe of ſutures; which, if employed at firſt, might have ſaved much trouble both to himſelf and the operator: For it is proper to obſerve, that in caſes where the operation is applicable, the method of cure by ſutures, when rightly conducted, never fails; at leaſt I have never known an inſtance of its doing ſo. It ſometimes happens, indeed, that the deficiency of parts

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is ſo great, as to render it impoſſible by any means to keep them in contact; and if ſutures are employed in caſes of this kind, they will no doubt fail. This, however, is not the fault of the remedy, but of the operator, in uſing it in an incurable variety of the diſeaſe.

As I have had often occaſion to put this operation in practice, and being at firſt prepoſſeſſed in favour of the method of cure by bandages and plaſters, I gave them both a fair trial; and the reſult was exactly what I have mentioned. I found, that by a proper application of bandages and plaſters, a complete cure might in ſome inſtances be obtained, but that the greateſt care and attention could not enſure ſucceſs; and finding that diſappointments never occur from the uſe of ſutures, I have now laid every other method aſide; and hitherto I have had no cauſe to regret my having done ſo. I ſhall therefore proceed to deſcribe the operation as it ought to be performed with ſutures; and as none of the methods by bandages or ſutures will ever

ever probably be received into general uſe, it would be conſidered as ſuperfluous to give an account of them: And beſides, our doing ſo here is unneceſſary, as the ſubject has already been fully treated of by various authors of reputation, particularly by Monſieur Louis of Paris, who has given a paper in the 4th Volume of the Memoirs of the Royal Academy of Surgery, that contains every argument that has been ſuggeſted in favour of this method of curing the hare-lip with bandages.

In proceeding to the operation, the patient, if an adult, ſhould be ſeated oppoſite to the light, with his head properly ſupported by an aſſiſtant; but if a child, he will be more firmly ſecured if laid upon a table, and kept in a proper poſture by an aſſiſtant on each ſide.

The upper lip ſhould now be completely ſeparated from the gums beneath, by dividing the frenum that conjoins them. This admits of the lip being more equally ſtretched; and when one of the fore-teeth is found oppoſite to and projects into the fiſſure,

fiſſure, as ſometimes happens, it ought to be taken out, otherwiſe it will irritate and ſtretch the parts if allowed to remain. In ſome inſtances, too, eſpecially when the fiſſure runs through the bones of the palate, a ſmall portion or corner of bone is found to project from one or both of the angles. This ſhould likewiſe be removed; and it may be eaſily done with pliers or forceps, which ſhould be both firm and ſharp, as is repreſented in Plate XLIII. fig. 2.

Theſe preparatory ſteps being adjuſted, the ſurgeon, ſtanding on one ſide of the patient, muſt take one ſide of the lip between the thumb and fore-finger of his left hand; and deſiring an aſſiſtant to do the ſame with the oppoſite ſide, and to ſtretch it ſomewhat tightly, he ſhould with a ſcalpel make an inciſion from the under border of the lip up to the ſuperior part of it; in which he muſt take care to include, not only all the parts immediately concerned in the fiſſure, but even a ſmall portion of the contiguous ſound ſkin and parts beneath:

And

And this being done on one ſide, a ſimilar inciſion muſt be made on the oppoſite ſide; which ought to be of the ſame length with the other, terminating in the ſame point in the upper part of the lip. By this means, if the operation is rightly done, a piece, including the fiſſure completely, will be cut out, of the form of the letter V inverted; and the deficiency will in every part of it have the appearance of a recent wound.

With a view to prevent inflammation, the divided arteries ſhould be allowed to diſcharge freely; eſpecially if the patient is plethoric; and this being done, the ſurgeon ſhould proceed to unite the ſides of the fiſſure. In this he will be much aſſiſted by deſiring the cheeks to be puſhed forward ſo as to bring the edges of the wound nearly into contact, although not altogether ſo cloſe as to prevent him from ſeeing freely from one ſide of it to the other; the aſſiſtant behind being deſired to ſupport the parts in this ſituation during the remaining ſteps of the operation.

The ſurgeon is now to ſee that the two ſides of the cut correſpond exactly with each other; and this being done, the pins intended to ſupport them muſt be introduced in the manner I have mentioned in deſcribing the twiſted ſuture, Chap. V. Sect. V. The firſt pin ſhould be near to the under edge of the lip: If poſſible, indeed, it ſhould be placed entirely within the red part of the lip, leaving no more ſpace beneath than is merely neceſſary to ſupport it. In adults, another pin ſhould be inſerted in the centre of the cut, and a third within a very little of the ſuperior angle. By ſome we are adviſed to uſe a greater number of pins; but even in adults three are always ſufficient, and in infants two will very commonly anſwer. In paſſing them, they ſhould be made to enter nearly half an inch from the edge of the ſore; and being carried nearly through the whole ſubſtance of the lip, which will be ſeen by retaining the wound open in the manner I have adviſed, they muſt be again paſſed outward, in a ſimilar direction, and

to

to an equal diſtance on the oppoſite ſide of the fiſſure.

The aſſiſtant ſhould now puſh forward the cheeks, and having brought the edges of the ſore cloſe together, a firm waxed ligature ſhould be applied over the pins in the manner I have formerly mentioned for the twiſted ſuture, as will perhaps be better underſtood by fig. 3. Plate XLIV. The ligature ſhould firſt be applied to the under pin, and being made to paſs two or three times round it, ſo as to deſcribe the figure of 8, it ſhould then be carried to the contiguous pin; and being in a ſimilar manner carried round this pin, the operation is finiſhed by carrying it to the other; care being taken in the whole courſe of applying it, to draw it of ſuch a tightneſs as may retain the parts in contact; but not ſo ſtrait as to irritate or inflame them, as is too frequently done.

By ſome we are deſired to uſe a ſeparate thread for every pin, in order, as they ſay, to admit of one pin being removed, if it ſhould become neceſſary, without

diſturbing the others. This, however, I have never found to be the caſe; ſo that the precaution is unneceſſary, while it deprives us of the advantage of paſſing the ligature diagonally from one pin to another, by which we have it in our power more effectually to prevent the ſides of the fiſſure between the pins from riſing into unequal heights than otherwiſe could be done.

A piece of lint covered with mucilage to retain it, ſhould now be put over the cut, with a view to protect it more effectually from the air; and it ſhould likewiſe be made to cover the ends of the pins, to prevent them from being entangled with the bed-clothes, or otherwiſe; and this is all the dreſſing or bandage that in general we ought to apply. We are deſired indeed by many, after the pins are all ſecured with ligatures, to apply the uniting bandage, in order to ſupport the muſcles of the cheek, ſo as to prevent the pins from cutting or irritating the parts through which they paſs, which they are apt to do, when

when the deficiency of parts is conſiderable.

In the courſe of my experience, however, no benefit has enſued from this, while in ſome inſtances it does harm, for a bandage cannot be applied with ſuch tightneſs as to give ſupport to the muſcles of the cheek without exciting pain in the parts newly divided; and it alſo proves hurtful, as I have elſewhere obſerved, by preſſing upon the ends of the pins over which it muſt paſs; for even although a ſlit is made in that part of the bandage which correſponds to the lip, as ſome have adviſed, preſſure upon the pins can ſcarcely be avoided: And beſides, although a bandage may be applied ſufficiently tight at firſt, the motion of the jaw commonly looſens it ſoon, ſo as to prevent it from having any farther effect. When, however, the deficiency of parts is great, and the edges of the ſore are with difficulty brought together, ſome advantage may be derived from a proper uſe of adheſive plaſters. An oblong piece of leather, ſpread

either with common glue, or with ſtrong mucilage, ſuch as is employed in making court-plaſter, being applied over each cheek, and of a ſize ſufficient for reaching from the angle of each jaw, to within an inch or thereby of the pins, and each piece of leather having three firm ligatures fixed to that end of it next the pins, one at each corner and another in the middle, the cheeks ſhould now be ſupported by an aſſiſtant, when the ligatures ſhould be tied ſo as to retain the parts in this ſituation; and if care is taken to make the ligatures paſs between the pins, and not immediately over them, little harm will be done them. It rarely happens, however, that this kind of aſſiſtance is needed; for I have, in almoſt every inſtance, found that the pins alone anſwer the purpoſe.

It is ſcarcely neceſſary to obſerve, that while the pins are in the lip, the patient ſhould be fed upon ſpoon-meat, and be prevented from laughing, crying, and ſtretching his mouth in any manner of way.

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The pins having remained in the lip for five or ſix days at fartheſt, they ſhould then be taken out; for I have found by experience, that the parts are by that time united; and by remaining longer, they are apt to leave marks which do not ſo readily diſappear as when they are removed ſooner. I have reaſon indeed to think, that three days would frequently prove ſufficient; but as I know from experience that the pins may, without detriment, be allowed to remain for five or ſix, I think it better not to remove them ſooner.

In order to illuſtrate what I have ſaid, ſome figures are delineated in Plate XLIV. repreſenting the appearance of a hare-lip before the operation,—the parts which ought to be removed,—the application of the pins,—and the appearance which the parts ſhould have when the operation is finiſhed. But for a more particular account of theſe, I muſt refer to the explanation of the Plate.

What I have hitherto ſaid relates to the diſeaſe in its moſt ordinary form. In

the caſe of a double hare-lip, the operation requires to be performed twice in all its parts; firſt in one fiſſure, and then in the other; although by ſome we are adviſed to do them both at the ſame time: But this ſhould never be attempted; for by doing ſo, we incur the riſk of loſing all the advantages to be derived from the intermediate ſound parts, and of which I once met with a very diſtreſsful inſtance. The ſound part of the lip lying between the two fiſſures, was by no means inconſiderable, but being much ſtretched with a great number of pins paſſed through it, it began to inflame immediately after the operation; and the inflammation and pain increaſing, the whole pins were obliged to be removed, and the patient would not afterwards ſubmit to any farther trial. We ought, therefore, firſt to complete the cure of one fiſſure; and this being done, we may in the ſpace of a few weeks venture with much ſafety on the other.

In deſcribing this operation, I have deſired, that although the fiſſure may not extend

tend the whole breadth of the lip, yet that the cut ſhould paſs up to the upper part of it; and any perſon accuſtomed to this operation, will know that the parts may be united much more neatly in this manner, than when the lip is only cut through part of its breadth. By one method of treatment, the parts, when drawn together, are ſmooth and equal; but by the other, they are apt to be uneven, and much puckered.

I have alſo deſired that the ſurgeon ſhould take particular care to make the two ſides of the cut exactly of an equal length; a point of much importance in this operation, and requiring more attention than it commonly meets with: For it is obvious, if one ſide of the wound is longer than the other, that the cicatrix will not be ſmooth and even, as it ought to be: By inſerting the firſt pin at the edge of the lip, this part of it will indeed be properly united, but the reſt of it muſt be uneven. The moſt effectual preventative of this, is to mark with ſmall dots of ink, not only

only the length of the cut on each ſide, but the direction that it ought to take, by which every chance of going wrong is guarded againſt.

It is of much importance to have the lip equally and tightly ſtretched in making the inciſion, otherwiſe the edges of the ſore will be ragged and uneven: This, with proper attention, may be always done; but with a view to guard againſt it as much as poſſible, curved forceps may be employed for laying hold of the lip. Different forms of theſe are delineated in Plate XLII. fig. 2. and 3. They ſhould be made ſo as to compreſs the lip equally; and being applied in the direction intended for the inciſion, the ſcalpel is carried along the ſide of them, by which the cut may be made very exact and even. Other forms of this inſtrument have been propoſed; but thoſe that I have delineated are more ſimple, and anſwer the purpoſe better than any that I have met with.

By ſome we are deſired not to employ any inſtrument of this kind, under an apprehenſion

prehenſion of its irritating and bruiſing the lip. This ſuſpicion, however, can have occurred only to thoſe by whom it has never been uſed; for when the blades are ſmooth and equal, a degree of compreſſion may be made with it perfectly ſufficient for fixing the lip without creating pain, which I can aſſert from much experience of its utility.

Inſtead of making the inciſion in this manner, ſome deſire it to be done by fitting a piece of paſteboard, lead, or tin, to the gums beneath; and the lip being placed on it, it is divided by cutting down on it with a ſcalpel to the ſupporting ſubſtance: The operation may no doubt be done in this manner, but the cut is more eaſily made in the manner I have adviſed.

Till of late, the inciſion in this operation was commonly made with ſciſſars; and although they are now very generally laid aſide on the ſuppoſition of their bruiſing the lip, yet I know that the operation may be very properly done with them. Sciſſars ſhould not be employed to cut a

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part of much thickneſs, but the lip is ſeldom ſo thick as to render it improper to uſe them in this operation. They have of late been uſed in this place by different practitioners; and as the point can be determined by experience only, I have likewiſe employed them. In order to aſcertain which of the two modes of operating, that with the ſcalpel or ſciſſars, ſhould be preferred, I have in different caſes made the inciſion on one ſide with a ſcalpel, and on the other with ſciſſars. The patients commonly ſay that the ſciſſars give leaſt pain, probably from their making the cut in leſs time than can be done with the knife; and, during the cure, that ſide of the lip on which the cut is made with ſciſſars, neither ſwells nor inflames more than the other. I do not from this, however, mean to ſay, that ſciſſars are preferable to the ſcalpel; I mention it only to ſhew that the common idea entertained of the effect of ſciſſars is ill-founded, and that the operation may be equally well done with both inſtruments. Sciſſars for this purpoſe ſhould be

be very ſtrong, and particularly firm at the joint. They ſhould alſo be highly poliſhed. The ſize and form of them repreſented in Plate XLIII. fig. 1. has been frequently uſed, and is found to anſwer.

When deſcribing the Twiſted Suture in Chapter VI., I gave the preference to gold pins; and I am clearly of opinion that they are the beſt. When of a proper form, ſuch as are repreſented in Plate IV. figs. 2. 3. and 4. they pierce the lip with much eaſe, without any aſſiſtance from a porte-aiguille: But thoſe who think that a ſharper and firmer point than can be given to gold will anſwer better, may have ſteel-points added, as is repreſented in figures 6. 7. and 8. of the ſame Plate; and the ſteel-points being moveable, they may be removed after the pins are paſſed, by which every riſk is avoided of wounding the contiguous parts. By ſome practitioners, flexible needles are employed for this operation; but they do not anſwer ſo well as thoſe that are firm, and give ſufficient reſiſtance to the ligatures.

In

In paſſing the needles, I have ſaid that they ſhould go nearly through to the oppoſite ſide of the lip: This merits particular attention, otherwiſe a fiſſure is apt to remain in the inner part of the lip, from which a good deal of trouble may be experienced. And beſides, although the diſcharge of blood that ſucceeds to this operation is always ſtopt immediately on the parts being drawn together by the ligatures if the pins have been properly introduced, yet when not paſſed to a ſufficient depth, the blood will continue to get out behind, and may afterwards be productive of much diſtreſs. I have ſeen an inſtance of this, where a very troubleſome oozing of blood continued for ſeveral days after the operation; and an inſtance is recorded even of death having enſued from it. In order to prevent the lip from being ſtretched by the patient in ſpitting, it is the uſual practice to deſire him to ſwallow his ſaliva with the blood that may be diſcharged from the ſore. In this caſe the patient complied implicitly with the directions

tions given him; and he having died from the cauſe I have mentioned, namely, a great loſs of blood, his ſtomach and bowels were found filled with blood that he had ſwallowed *.

I have thus deſcribed all the ſteps of the operation for the hare-lip; and it is proper to obſerve, that they are equally applicable in the treatment of a fiſſure in the lip by whatever cauſe it may be formed; only, in a recent cut, as the edges of it are already raw, all that the ſurgeon has to do is to inſert the pins and apply the ligatures. In wounds where ſuppuration has already commenced, there is uſually ſome degree of inflammation upon their edges. While this continues, it would be improper to draw them together by ligatures; but as ſoon as the inflammation ſubſides, we may with ſufficient propriety inſert the pins and finiſh the operation in the manner I have adviſed. We are told indeed by many, that this practice will ſucceed

* Vide Mémoires de l'Academie Royale de Chirurgie, Tom. iv. p. 427.

ceed only in recent wounds, and that it ſhould not be recommended where matter is already formed: I have often, however, acted otherwiſe, and where the edges of a ſore have not become callous, they have never failed to unite with equal eaſe when covered with pus, as when perfectly recent, and covered with blood.

In caſes of hare-lip accompanied with fiſſure in the bones of the palate, after uniting the ſoft parts in the manner I have pointed out, ſome advantage may be derived from a thin plate of gold or ſilver exactly fitted to the arch of the palate, being fixed by a piece of ſponge ſtitched to the convex ſide of it, and inſerted into the fiſſure. If the ſponge is properly fitted and inſerted dry, the moiſture which it imbibes from the contiguous parts will for the moſt part make it remain ſufficiently firm, by which both ſpeech and deglutition will be rendered more eaſy. In ſome caſes, however, the form of the fiſſure is ſuch as to prevent the ſponge from having any effect. This always happens

pens when the opening is wideſt outwardly. For ſuch caſes other means have been propoſed, eſpecially thin plates with gold ſprings, made ſo as to fix upon the contiguous parts; but no invention of this kind has been yet found to ſucceed.

SECTION II.

Of the Extirpation of Cancerous Lips.

THE under lip is more frequently attacked with cancer than any other part of the body; and as we know of no internal remedy by which the diſeaſe can be cured, the only means we employ for it is the removal of the diſeaſed parts. When treating of cancerous ulcers, in the fifth Chapter of this work, I endeavoured to ſhew, that little dependence can be placed on arſenic or any other of the cauſtic applications, that have been ſo much recommended for this purpoſe; and that we are to truſt to the ſcalpel alone for relief.

When a cancerous ſore has ſpread over any conſiderable part of the lip, and eſpecially when the lip is altogether diſeaſed, all that a ſurgeon can do is to remove the diſeaſed

diſeaſed parts; to ſecure the divided arteries with ligatures, when this is found neceſſary; and to dreſs the ſore as a recent wound. In this manner a cancer may be effectually taken away; but it gives a very diſagreeable appearance, from the under teeth and gums being left uncovered; while the patient can neither retain his ſaliva, nor ſwallow liquids eaſily. There is here, however, no alternative; for where the whole lip is taken away, theſe inconveniencies muſt neceſſarily enſue, as there is no poſſibility of drawing the divided parts together.

But when the diſeaſe has not attacked any conſiderable part of the lip, we may always have it in our power to draw the edges of the cut together, ſo as to make them unite with the twiſted ſuture in the manner deſcribed in the laſt ſection; by which we not only prevent deformity, but the patient is equally capable as before the operation, of ſwallowing liquids and retaining his ſaliva: And beſides, this method of treatment, as I have elſewhere re-

marked, by leaving a ſmall extent of cicatrix, ſeems to have ſome effect in preventing a return of the diſeaſe; at leaſt this has been evidently the caſe with thoſe that have fallen under my obſervation. Where the operation has been performed in the uſual way, without drawing the divided parts together and uniting them with ligatures, the diſeaſe has in ſeveral inſtances returned: But, excepting in a very few unfavourable caſes, it has never returned where the hare-lip method of treatment has been employed. Nay more, this will ſometimes ſucceed where the other has failed. A man appeared at our Infirmary here with a cancer on the under lip. It had been twice removed by extirpation in the uſual way; but the diſeaſe returned after each operation almoſt as ſoon as the ſore was healed: The lip being ſufficiently full, the hare-lip method of treatment was next put in practice; the cure was accompliſhed; and I had an opportunity of knowing, eight years after the operation, that the man remained in good

good health, without any return of his diſeaſe. Nor ſhould we be deterred from doing the operation in this manner, by the diſeaſe being extenſive, if we find that the parts that have been divided can be drawn together and retained by the twiſted ſuture: And this, I may remark, may be always done where the diſeaſe does not render it neceſſary to remove almoſt the whole lip. The parts, forming the lip, ſtretch ſo conſiderably, that in general this method of treatment may be adviſed, although only a third part of the lip may remain.

With reſpect to the method of doing the operation, I muſt refer to the laſt ſection. In addition to which, I have to obſerve, that all the cancerous parts ought in the firſt place to be removed, taking care to form the cut in ſuch a manner as will moſt readily admit of the divided parts being eaſily and neatly drawn together. When the diſeaſe is ſeated in the lip only, the parts will have nearly the ſame appearance after this operation, as

after that for the hare-lip. But when the cancer extends to the cheek, as is ſometimes the caſe, a longitudinal diviſion of the lip will not only be needed, but alſo a tranſverſe cut into the cheek; both to be united by pins and ligatures: An operation which, in different inſtances, I have put in practice with very complete ſucceſs.

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CHAPTER XIV.

Of the DISEASES *of the* MOUTH.

SECTION I.

Anatomical Remarks.

BEFORE proceeding to conſider the diſeaſes that are the object of the preſent chapter, it may be proper to premiſe a ſhort anatomical deſcription of the teeth, gums, and jaws, the parts in which theſe diſeaſes are chiefly ſeated.

On examining a tooth, we find it divided into three parts;—that part of it which lies above the gums, termed the Body or Corona of the tooth;—the roots or fangs, which the gums, in a ſtate of health, cover entirely;—and a kind of depreſſion between the body and fangs, juſt where the gums commonly terminate, which we term the Neck of the Tooth.

The root, as well as the interior part of the corona, is compoſed of oſſeous matter; but it appears to differ from bone by our not being able to throw injections into it: For although we are told that this may be done, there is much reaſon to imagine that the opinion is ill-founded, from the beſt anatomiſts having failed in it *.

This oſſeous part of the teeth being of a ſoft texture, would ſoon ſuffer and wear away by maſtication: But nature has amply provided againſt this inconvenience; for we find all that part of them lying above

* Vide the Natural Hiſtory of the Human Teeth, by John Hunter, 2d edition, p. 36, &c.

above the gums, covered with a firm, hard ſubſtance, termed the Enamel. This part of a tooth, beſides being much harder than bone, differs from bone in our not being able to paſs the moſt ſubtile injection into it; nor can it be tinged by feeding an animal upon madder, or any other colouring ſubſtance, as is the caſe with every bone in the body. The enamel is thickeſt on the upper ſurface of the teeth, eſpecially in the grinders, where it is moſt needed; and it becomes gradually thinner as it approaches the neck, where it terminates. At this part we firſt find the periofteum, which, beſides covering all the roots of the teeth, is intimately connected with them, as well as with the ſurrounding ſockets.

In the interior part of every tooth we diſcover a hollow, or cavity, correſponding to the ſize and figure of the tooth itſelf. It commences by a ſmall opening in the extremity of the root or fang, at which the bloodveſſels and nerves of the tooth enter; and this canal becoming wider

der as it proceeds forwards, terminates at laſt in the body of the tooth, where the cavity is filled with a pulpy kind of ſubſtance, probably formed by an expanſion of the bloodveſſels and nerves that belong to it. A tooth with one root or fang has commonly only one hole or opening; but ſome teeth have ſeveral fangs, and every fang not only has a canal paſſing through it, but is ſupplied with diſtinct bloodveſſels, and probably with ſeparate branches of nerves, although theſe have never been clearly traced into them.

The teeth are fixed in what is termed the Alveolar Proceſs of each jaw. This conſiſts of a broad thick edge, with which the jaws are furniſhed, divided into ſeparate cells or openings for the fangs of the teeth; and the roots of the poſterior teeth being larger and more expanded than the others, we find accordingly that this part of the jaw is thicker and broader than the fore-part of it. In the upper jaw, this difference with reſpect to thickneſs, is increaſed by the antrum Highmorianum,

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a large cavity in each maxillary bone, immediately above the large molares or grinders of each ſide. This ſinus has no communication with the mouth, but it opens into the noſtril between the two oſſa ſpongioſa, by a canal which in the ſkeleton is large enough to admit a common quill. The alveolar proceſs of the upper jaw is divided from this cavity by a thin plate of bone, in which the roots of the poſterior molares commonly terminate; but in ſome ſubjects they paſs through this plate into the antrum itſelf.

The lower jaw is in infancy compoſed of two bones, united at the chin by what is termed the Symphyſis of the jaw. Theſe bones, however, are ſoon joined ſo firmly together, that they have the appearance of one continued and connected piece. Beſides the alveolar proceſs, the under jaw is on each ſide furniſhed with other two proceſſes, with which it is neceſſary for practitioners to be acquainted. The anterior, which ſeems to be chiefly intended for the inſertion of the temporal muſcle,

cle, is termed the Coronoid Proceſs. It ariſes in the form of a ridge from the outſide of the jaw oppoſite to the two poſterior molares; and proceeding backward and upward, it terminates in a thin ſharp point: And the poſterior, or Condyloid Proceſs, which is ſhorter, thicker, and ſtronger than the other, terminates in an oblong head or condyle, by which the articulation is formed between this bone and the head.

The coronoid proceſs gives a degree of ſtrength and thickneſs to the external plate of the alveolar proceſs in this part of the jaw, that does not take place in any other part of it. This renders it improper to extract the two laſt molares by turning them outwards. They ſhould always be pulled towards the inſide of the mouth. Through all the reſt of the jaw, the ſockets or alveolar proceſſes are weakeſt on the outſide, although the difference is inconſiderable; and they are in both ſides weaker in the upper than in the under jaw.

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The full number of teeth in an adult is thirty-two; and being of different forms, and intended for different purpoſes, they are accordingly diſtinguiſhed by particular names. The four anterior teeth in each jaw are named Inciſores; the next to theſe on each ſide are the Canine; and the five poſterior teeth on each ſide are termed the Molares or Grinders; the two firſt the Small molares, and the other three the Large molares or grinders.

In childhood there are only twenty or twenty-four teeth, which continue till the ſixth or ſeventh year, when they begin to drop, and are ſucceeded by others, termed the Adult or Permanent Teeth. The firſt ſet, or Milk Teeth as they are commonly called, as well as ſome of the others, are formed in the jaw before birth; but they do not in general appear above the gums till the child is ſeveral months old. In ſome inſtances, about the fourth or fifth month, but moſt frequently about the eighth or ninth, two of the inciſores

ſores appear in the lower jaw. Theſe are commonly ſucceeded by two in the upper jaw, and the other four fore-teeth appear afterwards, at uncertain periods, between this and the tenth or twelfth month. About the ſixteenth or ſeventeenth month, four of the large molares appear; for in childhood there are no ſmall molares: One of theſe puſh out on each ſide, leaving a ſpace between them and the inciſores for the canine teeth; which being formed farther up in the jaw, ſeldom appear before the twentieth month: But about this period, or between this and the end of the ſecond year, they and other four molares commonly make their appearance.

Theſe are the periods at which the infantine ſet of teeth uſually appear; but much variety is met with in this. I have known the canine teeth appear before any of the molares. In one inſtance, they came forward before two of the inciſores. In ſome caſes the inciſores have been obſerved

ſerved in the ſecond and third months, nay, even at birth; whilſt in others, I have known the fourteenth or fifteenth month paſs over before any have appeared.

Theſe teeth continue firm till the fifth or ſixth year. About this period they begin to looſen; and between the ſeventh and twelfth year they are commonly all ſhed and ſucceeded by others. By this period, too, the jaws are ſomewhat lengthened, ſo as to admit of other four molares. Between the twelfth and ſixteenth years four others appear; and about the eighteenth, nineteenth, or the twentieth year, the four laſt of the molares appear, uſually named the Dentes Sapientiæ.

The two ſets of teeth have very different appearances, inſomuch that we may in general know, from the appearance of a tooth, whether it belongs to the infantine or permanent ſet; and as this is often a point of importance, practitioners ought all to be able to judge of it; particularly

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in the treatment of thoſe diſeaſes of the teeth that occur about the time of ſhedding the firſt ſet; for it frequently happens that we would have no heſitation in pulling a tooth, were we certain that it belonged to the firſt ſet; while we would rather allow it to remain, if it appeared to be one of thoſe that ſhould continue during life. It has happened, indeed, in a few inſtances, that a third ſet of teeth have appeared; but this is ſuch a rare occurrence, that it can only be conſidered as a very unuſual deviation of nature.

The ſockets of the teeth, and a ſmall portion of the teeth themſelves, are covered with a red, firm, fleſhy kind of ſubſtance, termed the Gums. This ſubſtance ſeems to be almoſt entirely vaſcular; for the ſlighteſt wound or ſcratch in it is always attended with a diſcharge of blood. The alveolar proceſs of each jaw is entirely covered with it; ſo that there is a ſmall portion of gums between every two teeth.

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In ſome diſeaſes, particularly in the ſcurvy, a partial ſeparation of the gums from the teeth often takes place; but in a healthy ſtate they adhere ſo firmly to the necks of the teeth as to have ſome effect in fixing them in their ſockets.

We ſhall now proceed to treat of the diſeaſes of theſe parts, and of the operations performed upon them.

SECTION II.

Of Dentition.

DURING the approach of the firſt ſet of teeth, and in ſome inſtances of that of the ſecond, much diſtreſs is apt to ariſe from the irritation which they excite in the gums. For this reaſon I have thought it right, before proceeding to the diſeaſes of the mouth, to offer a few general obſervations on Dentition.

In dentition, the gums inflame and become full about the part where the teeth are afterwards to appear. The child is conſtantly rubbing them with his fingers. The ſaliva is for the moſt part increaſed in quantity; but in a few inſtances it is otherwiſe, and the mouth becomes perfectly dry. The bowels are commonly very irregular, ſo that we ſeldom meet with a medium

medium between obſtinate coſtiveneſs and ſevere degrees of purging: The heat of the body is increaſed, and quickneſs of pulſe takes place, along with other ſymptoms of fever. Theſe are the moſt frequent ſymptoms of dentition; but it often happens that ſubſultus tendinum, and even convulſions ſupervene.

As theſe ſymptoms all ariſe from irritation, thoſe means are chiefly to be truſted that prove moſt effectual in counteracting this. Hence we derive much advantage from opiates, blifters, and eſpecially from warm bathing. But when theſe fail, which they often do, we have it frequently in our power to remove every ſymptom, by making an inciſion through the gums directly upon the approaching tooth or teeth; an operation uſually termed Scarification of the gums.

A common prejudice prevails againſt this operation, from an idea of its doing harm in the event of a cicatrix being left upon the gums; which ſometimes happens when the tooth is not juſt at hand; for it

is ſuppoſed that the cicatrix will afterwards be worſe to penetrate than if the gum had not been touched. For this reaſon, the operation is ſeldom or never adviſed till the tooth is obſerved to have elevated the gum: But in this we are wrong; for when delayed ſo long, almoſt all the advantages that might be derived from it are loſt. I have commonly obſerved, that the very worſt ſymptoms of dentition take place, before the teeth have come this length; and that they uſually abate on the teeth approaching towards the ſurface of the gums, probably from their being rendered more inſenſible by the long-continued preſſure of the teeth beneath.

Whenever there is cauſe, therefore, from the ſymptoms, to ſuſpect that they are owing to this cauſe, we ſhould without heſitation make a free inciſion through that part of the gums where the tooth appears to approach; and if this inciſion ſhould afterwards heal, and if the ſymptoms ſhould again ſupervene, no riſk could occur from the operation being repeated. I have

have frequently found it neceſſary to cut two or three times upon the ſame tooth; but with a view to prevent the neceſſity of this, I commonly make a crucial inciſion down to the depth of the tooth, and I have never found it to do harm. We need never be afraid of hemorrhagy. Indeed the cut ſeldom bleeds above a few drops, and it commonly heals eaſily.

The operation may be done with a common lancet; or with a biſtoury or ſcalpel; the inſtruments uſually employed for it: But it cannot be neatly done with any of theſe; and beſides, we are in danger, either with a lancet or ſcalpel, of hurting the contiguous parts. The inſtrument repreſented in Plate XXXVI. fig. 4. is not liable to any of theſe objections; and being of a ſmall ſize, it may be entirely concealed in the palm of the hand. The child being ſecured by the nurſe, the ſurgeon with the fingers of one hand ſhould open the mouth; and conducting the edge of the inſtrument with the fore-finger of the other, the inciſions ſhould be finiſhed

before it is withdrawn, care being taken to make a crucial cut over every tooth that appears to be approaching. The inciſion, as I have already adviſed, ſhould always be carried to the depth of the tooth, ſo as to lay it entirely bare; and when this is freely done, the effects that reſult from it are often remarkable. I have ſeen inſtances of children being inſtantly relieved by it, who previouſly appeared to be in the moſt imminent danger.

It ſometimes happens, too, as I have already obſerved, that diſagreeable ſymptoms take place from the approach of the ſecond ſet of teeth. I have known pain produced over the whole jaw, attended with ſwelling and inflammation of the gums, cheeks, and contiguous parts, from a ſingle tooth not getting freely out. This happens moſt frequently with the dentes ſapientiæ; in ſome inſtances, from the irritation that they produce upon the gums, which in the back-part of the jaws are very thick; but in others from their not being room in the jaw to admit them. In the

the firſt caſe, we have it commonly in our power to remove all the ſymptoms, by making a free inciſion directly upon the tooth; but in the other this does not always prove ſufficient, and nothing will frequently anſwer but extraction of the tooth. When the ſymptoms are found to proceed from this cauſe, we ſhould not heſitate in removing the tooth: For it ſeldom happens that any advantage is gained from delaying it, while the inflammation induced upon the gums often ſpreads to the throat and contiguous parts; and is thus productive of much diſtreſs, which might be eaſily prevented. When the throat inflames and ſwells, no other remedy will anſwer, while the moſt violent degree of inflammation will be removed in the courſe of a ſhort time, by the removal of the tooth. This I have known where the ſymptoms had obſtinately reſiſted every other means for a great length of time.

SECTION III.

Of the Derangement of the TEETH.

THE ſecond ſet of teeth frequently appear in a very irregular manner: Some of them will be very properly placed, while ſome are farther out, and others farther in, than they ought to be. When the derangement is not very remarkable, it ſeldom meets with much attention; but it often happens, that the deformity is ſo conſiderable, that artiſts are applied to for removing it. It happens moſt frequently with the inciſores and canine teeth, ſeldom with any of the molares.

Derangements of the teeth may take place from different cauſes:—From a deficiency of ſpace in the jaw, by which they cannot be all admitted in the ſame line;—from a natural mal-conformation;

—or

—or from ſome of the firſt ſet remaining firm after the ſecond ſet have appeared.

We often find, that teeth that are out of the line will fall into it without any force being applied to them, on ſpace being given them by one or more of thoſe in the line being pulled. When it appears, therefore, that the derangement proceeds from any of the firſt ſet not having dropped, they ought to be removed; for the longer this is delayed, there will be the leſs chance of the irregular teeth falling into their ſituation: But when it even proceeds from thoſe of the ſecond ſet being too large for the ſpace they are to fill, we ſhould not heſitate in removing ſome of them, for no other method will anſwer. When the teeth which occupy the natural circle of the jaw are regular, and have a good appearance, the tooth or teeth that are out of the circle ought to be pulled; but when either of the contiguous teeth do not fill the place ſo properly as theſe would do, or when they are rough, or otherwiſe of a diſagreeable appearance, it

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is ſometimes adviſable to remove one of theſe that are in the circle, while at the ſame time we endeavour to bring the others into it. If this is done before the teeth have been long fixed, and if they are not far diſtant, they will ſometimes in a gradual manner, as I have already obſerved, fall into the vacancy without any aſſiſtance; but when this does not happen ſoon by an effort of nature alone, we may frequently employ means for promoting it. No attempt, however, of this kind can be made till the body of the deranged tooth has paſſed freely out from the gums, as till then we cannot with eaſe lay hold of it.

The uſual method of moving teeth that are out of the range, is to apply a ligature round them, and pulling it tighter from time to time, to fix each end of it firmly to the contiguous teeth: Or a plate of gold or ſilver is fitted to the contiguous teeth, and made to ſurround the deranged teeth in ſuch a manner, that when firmly preſſed down by the oppoſite jaw, it acts with conſiderable

conſiderable force in bringing the teeth nearer together. This laſt method, however, proves troubleſome to the patient; and the other, while it in ſome degree moves the deranged teeth towards the circle, ſerves nearly in the ſame degree to draw the others out of it: but we may in a different manner apply a ligature for this purpoſe with ſafety, and it is the beſt that I have ſeen for the purpoſe. Let a thin plate of gold, of a length ſufficient to paſs over four of the contiguous teeth, be exactly fitted to the outſide of the two teeth on each ſide of the vacancy into which the deranged tooth is to be moved. The plate ſhould be perforated with ſeveral ſmall holes: On being applied to the teeth, and fixed to them with a bit of waxed thread, let a piece of flexible wire be paſſed through two of the holes; and the doubling of the ligature being carried over the tooth to be moved, the two ends of it ſhould be firmly drawn through the holes, and fixed with pliers. Every two or three days the ligature ſhould be made tighter;

and

and this being continued, almoſt every tooth in this ſituation may at laſt be brought into the circle.

It ſometimes happens that much deformity is produced by an opening in the anterior part of the jaw, formed either by one or more teeth being accidentally driven out, or from there being a natural want of them. When a ſurgeon is called immediately on a tooth being driven out, he ſhould inſtantly replace it; or if the tooth is broken, or otherwiſe much injured, he may conſult the inclination of the patient with reſpect to the tranſplanting of a ſound one from the mouth of another perſon. But patients ſeldom complain till the injured parts have become inflamed and tumefied, when it is too late to put this method of treatment in practice. In this ſituation we muſt wait till the pain and ſwelling are removed; when, if more than one tooth is wanting, the deficiency muſt be ſupplied with artificial teeth fixed to thoſe which remain firm; but when one tooth only is wanting, we

may

may frequently, in young people, be able to remove the deformity, by paſſing a ligature round the two contiguous teeth, ſo as by degrees to draw them nearer together. Nature will frequently accompliſh this, in ſome degree, of herſelf: But the operation is commonly ſlow; and beſides, it is ſeldom done ſo completely as when ligatures are employed. By this means the bodies of the teeth are equally drawn together; but when ligatures are not uſed, although the teeth, from want of ſupport, will fall nearly together at their points, the opening will commonly remain nearly the ſame at their roots.

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SECTION IV.

Of Gum Boils.

THE gums, like all the ſoft parts of the body, are liable to abſceſſes; but they are more frequent here than in other parts, from the gums being more expoſed to cauſes that tend to produce them. Abſceſſes may in this ſituation proceed from cold and from external violence, as well as from every cauſe that tends to produce inflammation in other parts; but for the moſt part we may trace them as the conſequences of toothach: And they ariſe not only from carious teeth, but from inflammation at the roots of teeth, when perhaps in every other reſpect the teeth are perfectly ſound.

A gum-boil commonly appears after a fit of toothach has continued for ſome time.

time. It begins with ſome degree of pain, attended with a ſmall tumor on the part affected. By degrees the cheek ſwells; and this ſwelling frequently ſpreads over the whole face, ſo as to produce much deformity. On ſuppuration taking place, the ſmall tumor, which is commonly ſeated on the outſide of the gums, exactly oppoſite to the diſeaſed tooth, begins to point; and if it be not opened, it generally burſts either through an opening in the ſide of the gum, or between the gum and the tooth. A quantity of matter is now commonly diſcharged, by which the patient is in general completely relieved. But as the cauſe ſtill remains, the diſcharge likewiſe continues; for the diſeaſe being moſt frequently induced by ſome affection of a tooth, or by a portion of the jaw becoming carious, a diſcharge of matter uſually continues, either till the tooth is removed, or till the carious part of the jaw has exfoliated: Or, if the opening happens to cloſe, the diſeaſe is quickly renewed; the ſwelling returns, and again goes through all the

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ſtages of inflammation and ſuppuration in the manner I have juſt deſcribed. When, indeed, the diſeaſe proceeds merely from inflammation at the root of a tooth, and when the root happens not to be denuded of its perioſteum, after the matter of the abſceſs is diſcharged, the ſides of it may collapſe and adhere, and a cure will in this manner take place: But when it ariſes either from a carious tooth, or from a carious portion of the jaw, or even when it proceeds from inflammation alone, if the root is laid bare by the matter, the diſeaſe will recur from time to time, till the tooth or carious part of the jaw is removed; for theſe will continue to irritate the contiguous parts in the ſame manner with extraneous bodies of any other kind. In the caſe of a ſpoiled tooth, we ſhould adviſe it to be immediately removed; but when the diſeaſe proceeds altogether from inflammation at the root of a tooth, before pulling it every method of a more ſimple nature ſhould be tried; and the ſame means that we employ for the cure of abſceſſes

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in other parts, ſhould be put in practice here. When a free opening is formed by the burſting of the abſceſs, we may ſometimes be able to dry up the running, by injecting from time to time lime-water,—ardent ſpirits,—tincture of myrrh,—or tincture of Peruvian bark properly diluted. But although trials of this kind may be adviſable with timid patients, who will not ſubmit to other means, we can ſeldom place much dependence upon them: Our ſureſt practice is to lay the abſceſs open by an inciſion from one end to the other, and to endeavour to heal it from the bottom, by inſerting a ſmall doſſil of lint between the edges of the cut, with a view to open them, till a ſufficiency of granulations form beneath. This is the ſureſt method of obliterating the impoſthume; and when any part of the ſocket is carious, it will in this manner more readily exfoliate than it would do were it ſtill covered with the gums.

I have hitherto been ſuppoſing that the matter has been collected in the ſubſtance

of the gums, or between the gums and the tooth, or perhaps that it ſurrounds the ſocket of the tooth; but abſceſſes in theſe parts are often more deeply ſeated, when they not only create more immediate pain and diſtreſs, but more ſubſequent riſk: For when the more ſolid parts of the jaw become carious, which they commonly do when the matter of impoſthumes gets into contact with them, the cure not only proves tedious, but external marks of a diſagreeable kind are apt to enſue from them. With a view to obviate this, the uſual practice of applying warm poultices ſhould be avoided; we ſhould rather, by warm fomentations taken into the mouth, and by the application of any warm ſtimulating ſubſtance, ſuch as a roaſted onion, to that part of the gum which appears to be moſt affected, endeavour to promote the formation of any abſceſs that may point into mouth; and as ſoon as matter appears to be formed in it, it ought to be opened without waiting till complete ſuppuration has taken place.

In

In the after-treatment of the abſceſs, all that we can do is to preſerve a free depending orifice for the diſcharge of the matter, by which any farther miſchief will be prevented, and by which alone we can reaſonably expect a cure; for even where the diſeaſe is connected with a carious ſtate of the jaw, giving a free vent to the matter is perhaps all that art ought to attempt. If the conſtitution is otherwiſe ſound, this, together with the removal of any of the contiguous teeth that are diſeaſed, and of ſuch parts of the jaw as are carious, and ſeparate from the reſt, will ultimately effect a cure, if this by any means can be done. But in diſeaſed habits of body, eſpecially in ſcrofulous conſtitutions, this kind of tumor is always of difficult management, and can ſeldom indeed be healed till the general diſeaſe of the ſyſtem is removed.

SECTION V.

Of Abscesses *in the* Antrum Maxillare.

Matter may collect in the antrum maxillare from various cauſes: Whatever tends to induce inflammation on the lining membrane of this cavity may produce them. Hence they may be induced by blows and other injuries done to the cheeks. Inflammatory affections of the membrane of the noſe, and even long-continued inflammation of the eyes, by ſpreading to the contiguous membrane of the antrum, have often an influence in producing collections of this kind; and much expoſure to cold has frequently been traced as the cauſe of them. But their moſt frequent origin is pain and irritation excited in the jaw by repeated and violent returns of toothach.

From

From this account of the cauſe, the nature of the ſymptoms will be readily underſtood. Indeed, if we make allowance for the nature of the parts in which theſe collections are ſeated, the ſymptoms will be found to be nearly ſuch as take place from inflammation and abſceſſes in other parts of the body. At firſt ſome degree of pain is felt over the cheek, and this commonly continues for a conſiderable time before any external ſwelling is perceived. On a farther continuance of the diſeaſe this pain becomes more ſevere, and in ſome inſtances ſpreads to the neighbouring parts, ſo as to create uneaſineſs in the eye, noſe, and ear; and at laſt an extenſive hard ſwelling appears over the whole cheek, which ſooner or later points at a particular place, moſt frequently in the centre of the cheek, a little above the roots of the poſterior molares. In ſome inſtances, indeed, the matter burſts out between the roots of theſe teeth and the gums, by which the external tumor upon the cheek is prevented from pointing.

This, however, does not commonly happen; and it only takes place, I imagine, when the roots of the teeth penetrate the antrum, by paſſing through the palate at the bottom of the ſocket. For the moſt part, too, as ſoon as matter is fully formed in the antrum, we find ſome of it diſcharged by the correſponding noſtril when the patient lies upon the oppoſite ſide with his head low; and if this frequently happens, it prevents the external ſwelling for a conſiderable time from pointing at any particular place, and conſequently from burſting, which it would always do if the matter was not diſcharged in ſome other manner.

This diſcharge of matter by the duct leading from the antrum to the noſe, does not, indeed, take place in every inſtance; but as I have met with it in ſeveral caſes, I am not inclined with Mr Hunter to conſider the obliteration of this duct as a frequent cauſe of theſe collections *: Indeed

I

* See a Practical Treatiſe on the Diſeaſes of the Teeth, &c. by John Hunter, F. R. S. &c. p. 44.

I doubt if it is ever the cauſe of them. For the moſt part, they may be traced as the effect of one or other of the cauſes that I have mentioned; particularly of toothach, or of inflammation excited by cold, or in ſome other manner. When obſtructions, therefore, happen in this duct, they are rather to be conſidered as a conſequence of the diſeaſe: More frequently, perhaps, as the effect of the adheſive ſtage of inflammation, than as the cauſe of the collection.

A diſcharge of matter from one of the noſtrils, when it ſucceeds to pain and inflammation of the cheek, will for the moſt part be found to proceed from an abſceſs in the correſponding antrum maxillare; but we ought to remember that matter may be diſcharged from the noſtrils from other cauſes; particularly from an inflamed ſtate of the membrana Schneiderіana; from an ozena; from affections of the frontal ſinuſes; and from abſceſſes in the lachrymal ſac. In forming our opinion, therefore, every circumſtance

connected with the diſcharge, ſhould be taken into conſideration, otherwiſe much diſappointment may enſue from our treating one diſeaſe for another.

In the treatment of abſceſſes of the antrum maxillare, nothing will accompliſh a cure but our giving a free diſcharge to the matter: Collections of matter, indeed, in this ſituation, ſhould be conſidered in the ſame light with affections of a ſimilar nature in whatever part of the body they may be: Wherever matter is diſcovered, it ought to be diſcharged; and in no inſtance is attention to this more neceſſary than in abſceſſes of the antrum maxillare: For if the matter be not diſcharged, it will diſtend and elevate the bones of the cheek, and at laſt render them carious.

With a view to prevent this diſtreſsful occurrence, an opening ſhould be made into the antrum as ſoon as we are convinced, from the nature of the ſymptoms, that it contains matter. It may be perforated in two different parts. In that part of it which projects outwardly over the

the two great molares; or one of theſe teeth may be taken out, and an opening made into the antrum, by perforating directly upwards in the courſe of one of the fangs. As moſt people wiſh to avoid the pulling of a teeth when not entirely neceſſary, the perforation is commonly made above the roots of the teeth. This lenity, however, proves often hurtful; for in this manner the perforation muſt be made in the ſide of the antrum, by which a depending opening cannot be given to the matter; nor can it be obtained in any other way than by making a perforation in the manner I have mentioned in the direction of one of the roots of the teeth.

I have already obſerved, that either of the two large molares may be drawn in order to admit of this perforation. When either of them is ſpoiled, the diſeaſed tooth ſhould be taken out; for being carious, there will be cauſe to ſuſpect that it may have ſome ſhare in the formation of the diſeaſe: But when this is not the caſe, we ſhould remove the ſecond great molaris,

molaris, or that tooth which lies next to the dens ſapientiæ; for although the tooth immediately anterior to this is ſomewhat more acceſſible, the difference in this reſpect is inconſiderable; and the plate of bone that ſeparates the antrum from the roots of the teeth being thinner in the back-part of the jaw than in the anterior part of it, the perforation is accordingly more eaſily made in it.

On removing one of theſe teeth, matter in ſome inſtances is immediately diſcharged from the antrum; owing either to the roots of the teeth having been ſo long as to paſs into this cavity; or, to the matter having corroded the bone that ſeparates the roots of the teeth from the antrum: In this caſe, if the opening is ſufficient for giving a free vent to the matter, the operation will thus be finiſhed; but as it is eaſily enlarged, it ought always to be done where there is cauſe to doubt that the matter will not be diſcharged with freedom; and, when no diſcharge of matter takes place on pulling the tooth, an opening

muſt

muſt be made into the antrum in the manner I have already adviſed, by puſhing a ſharp inſtrument into it in the direction of one of the fangs. A common trocar is uſually employed for this, and in general the operation may be ſufficiently well done with it; but the curved inſtrument repreſented in Plate XXV. fig. 2. anſwers better. In making the perforation, the patient ſhould be ſeated on the floor oppoſite to a clear light, with his head laid back upon the knee of the operator, who may either ſtand or ſit behind him. The inſtrument ſhould be withdrawn as ſoon as it has entered the antrum, which is eaſily known by the reſiſtance being removed from the point of it. The matter will now flow out freely; and as ſoon as it is all diſcharged, a ſmall wooden plug, exactly the ſize of the trocar, ſhould be introduced into the opening, with a view to prevent, not only the air, but the food in maſtication, from getting into the antrum; and when the plug is properly fitted to the opening, it will remain ſufficiently firm, while

while at the ſame time there is no riſk of its ſlipping in, if formed with a knob or head ſomewhat larger than the opening.

This plug ſhould be removed from time to time, perhaps twice or thrice in the courſe of a day; by which all the matter will be quickly diſcharged; and no more being allowed to collect, the diſpoſition to form it will in general be ſoon removed, and a cure obtained. But in ſome inſtances, either from much relaxation of the lining membrane of the antrum, or from a tendency in that membrane to inflame, the diſcharge of matter does not diminiſh, but continues nearly the ſame both in quantity and conſiſtence long after the operation. In this caſe we may often forward the cure by throwing liquids of a moderate degree of aſtringency from time to time into the antrum. A decoction of bark is commonly employed for this purpoſe; but nothing ſhould be uſed that contains the leaſt particle of ſolid matter, as there is always ſome riſk, when liquids not properly filtered are injected, of depoſi-

tions

tions being left in the antrum; and in different inſtances I have ſeen miſchief enſue from this. I commonly employ a ſolution of alum, or ſaccharum ſaturni, brandy properly diluted, or lime-water.

When the contiguous bones are ſound, a cure will at laſt be accompliſhed by a continuation of theſe means; but when any of theſe bones are carious, it will be in vain to expect a cure till the diſeaſed portion either exfoliates, or diſſolves and comes away in the matter. By the introduction of a probe, we may always know whether the bones of the antrum are carious or not; but in general we may reſt our judgment on this point on the ſmell and appearance of the diſcharge. When the bones are carious, the matter is always thin and fetid, and it becomes thicker and leſs offenſive as this ſtate of the bone diminiſhes.

I have hitherto been ſuppoſing that the antrum is perforated for the purpoſe of giving a diſcharge to matter; but the ſame operation becomes neceſſary for the removal

removal of other cauſes. I once met with an inſtance of a violent blow on the cheek ending in a large collection of blood in this cavity; and worms that form in it can only be removed by this operation. In what manner worms are produced in this ſituation, is difficult to determine; but whenever their preſence is indicated, by ſevere pains in the region of the antrum, not induced by toothach or any other obvious cauſe, there can be no riſk in making an opening for extracting them; but in this caſe there is no neceſſity for removing any of the teeth. A perforation made into the antrum, immediately above the roots of the large molares, will anſwer the purpoſe ſufficiently. We ſhould not, however, reſt ſatisfied merely with extracting ſuch worms as appear at the opening: We ſhould inject from time to time ſuch liquids into the antrum as will moſt probably deſtroy any that may remain; particularly oil, a filtrated ſolution of aſafœtida, and perhaps a weak infuſion of tobacco: And the perforation ſhould be kept

kept open for a conſiderable time, to prevent as much as poſſible the riſk of any worms being left.

I have mentioned the only two parts in which I think the antrum can with propriety be opened; namely, in the direction of the roots of the two large molares of the upper jaw; and immediately above the roots of thoſe teeth on the outſide of the jaw. I think it right, however, to obſerve, that it has been ſaid that a perforation may alſo be made into the antrum from the noſtril. None will doubt of this being practicable; but we might with perhaps equal propriety, ſay, that an opening may be made into it by entering the inſtrument from the roof of the mouth. It is evident, however, that it would not be ſo proper to perforate the antrum in either of theſe parts as in thoſe that I have mentioned; and therefore I would not have judged it neceſſary to notice them here, were it not with a view to give my opinion of this method of making an opening from the noſtril; which being propoſed by very

very reſpectable authority, I think it right that the younger part of the profeſſion, for whom this is chiefly intended, ſhould know that there is much cauſe to doubt of the propriety of the advice *.

By purſuing the means that I have pointed out, all ſuch ſymptoms as ariſe from collections in the antrum maxillare may be removed: But the antrum is liable to ſwellings of a more hazardous nature, and which frequently do not terminate but in the death of the patient. The tumors to which I allude ſeem to proceed from an enlargement of the bones of the cheek. No matter is found in the antrum; and therefore no advantage is derived from our making an opening into it. I have in different inſtances, indeed, obſerved much miſchief enſue from it: For thoſe who are not accuſtomed with this branch of practice, are apt to be miſled by the ſtate and appearance of the ſwellings; and

* Vide the Natural Hiſtory of the Human Teeth, Part II. p. 46. firſt edition. By John Hunter, F. R. S. &c.

and ſuſpecting that they contain matter, they very commonly make perforations into them, which frequently aggravate all the ſymptoms by occaſioning a more rapid increaſe of the diſeaſe. We ſhould therefore attentively diſtinguiſh between ſwellings of this kind and real collections of matter in the antrum. In the latter, the cheek ſeldom ſwells to any great extent; and when the diſeaſe is of long duration, if the matter does not find an opening into the noſtril, or along the roots of the teeth, it commonly points towards the moſt prominent part of the cheek. But when no matter is collected, and the diſeaſe proceeds from a carious ſtate of the bones, the ſwelling by degrees arrives at a conſiderable ſize, but it ſpreads equally over the whole cheek, without pointing at any particular part, excepting in its more advanced ſtages, when the ſurrounding ſoft parts becoming diſeaſed, matter ſometimes forms in them. Till the ſkin becomes inflamed, which does not happen till the diſeaſe has been of long continuance, the ſwelling re-

mains perfectly colourleſs; but the moſt characteriſtic mark of it is a remarkable degree of elaſticity which it acquires. The bones yield to preſſure; but they inſtantly return to their ſituation on the finger being removed; and if in this ſtate an inciſion is made into them, which in different inſtances I have known done, they are found to be reduced to a ſoft cartilaginous ſtate, and in the advanced ſtages of the diſeaſe to a conſiſtence ſomewhat gelatinous.

This kind of ſwelling is of a nature ſo very obſtinate, that hitherto I have ſcarcely known any benefit derived from any remedy that has been employed for it. In a few caſes where it appeared to ariſe from carious teeth, the removal of the teeth has put a temporary ſtop to its progreſs. But even this has never produced any permanent benefit; I mean in the diſeaſed ſtate of the bones that we are now conſidering; for the cheek is, like other parts of the body, liable to ſwellings of a more harmleſs nature, which yield to the

remedies

remedies commonly employed for them. But in this no material benefit is derived either from medicines or external applications. A long-continued gentle courſe of mercury, along with decoction of mezereon, I have ſometimes known prove uſeful; but neither theſe, nor any other remedy that I have uſed, have ever produced a permanent cure.

SECTION VI.

Of Excrescences *on the* Gums.

Excrescences of different degrees of firmneſs occaſionally form on the gums: They are all of a red colour, nearly the ſame with the gums themſelves; but ſome of them are ſoft and fungous, while others are firm, and even of a hard warty nature. In ſome, they are painful; but for the moſt part they create no further inconvenience than an impediment in ſpeech and maſtication. We meet with them in both jaws, but moſt frequently in the under jaw, and in the inſide of the teeth. In ſome inſtances they are connected to the gums by a ſmall neck, but in general they adhere firmly through their whole extent.

This kind of excreſcence frequently originates from carious teeth, and in a few inſtances

inſtances from a carious ſtate of the alveoli; in which caſe the removal of the ſpoiled teeth, and the ſubſequent exfoliation of the carious part of the jaw, will often accompliſh a cure. Like fungous excreſcences in other parts of the body ariſing from a carious bone beneath, as ſoon as the diſeaſed part of the bone is removed, the excreſcence uſually begins to ſhrivel, and at laſt diſappears entirely: But when this does not happen, it ſhould be removed as ſoon as it gives pain; and this ſhould be the more readily done, as the operation is attended with little or no riſk. An averſion, indeed, generally prevails againſt meddling with this kind of tumor, either from an idea of its being cancerous, and that it will probably be rendered more inveterate by an operation; or from a dread of the hemorrhagy that the operation will induce. I know, however, from experience, that there is no cauſe to be afraid of this. I have extirpated many tumors of this kind; and I never knew an inſtance of cancer having follow-

ed, or of any hemorrhagy of much importance.

When the excreſcence is attached to the gums by a narrow neck, it ſhould be removed by paſſing a ligature round it ſufficiently tight for making it fall off; but when connected to the contiguous parts by a broad baſe, we are under the neceſſity of taking it away with the ſcalpel. The actual and potential cautery uſed to be employed for this; but as this practice is now laid aſide, and never likely to be revived, I do not think it neceſſary to ſpeak of it further.

In proceeding to the extirpation of the tumor, the patient ſhould be firmly ſeated oppoſite to a clear light, with his head ſupported by an aſſiſtant ſtanding behind. If he is poſſeſſed of ſufficient reſolution, no inſtruments will be needed for keeping the mouth open; but where we cannot with certainty truſt to this, which with children is always the caſe, a ſpeculum oris becomes requiſite. Of this inſtrument, we have various forms. Thoſe in common

common uſe are repreſented in Plate XLI. fig. 2. and 3.; but they occupy too much ſpace in the mouth to admit of the free application of other inſtruments. To obviate this, I ſome time ago propoſed the one delineated in the ſame Plate, fig. 1.; and by experience it is found to anſwer.

A common ſcalpel will for the moſt part anſwer for diſſecting the tumor away; but an operator ſhould always be provided with others, particularly with a curved knife, ſuch as is repreſented in Plate XXI. fig. 1. and likewiſe with crooked ſciſſars, ſuch as are delineated in Plate XXXVI. fig. 1. and 2.; for in ſome caſes the roots of the excreſcence are more eaſily ſeparated with a curved ſcalpel and ſciſſars, than with thoſe of a ſtraight form. But whatever inſtrument is employed, much advantage may be derived from raiſing the tumor as much as poſſible from the parts beneath with a diſſecting hook; and for this purpoſe a hook ſhould be uſed with two fangs, ſuch as is repreſented in Plate XXXVII. fig. 3. In the

courſe of the operation, care ſhould be taken to remove the diſeaſe entirely, at the ſame time that the inciſion ſhould not be carried ſo deep as to injure the parts beneath, unleſs the tumor is firmly and cloſely attached to them; in which caſe, it may not only be proper to remove a portion of the gums, but even to go to the depth of the ſocket: But as this will incur the riſk of injuring the contiguous teeth by laying their roots bare, it ſhould never be done when with any propriety it can be avoided.

After the operation, the bloodveſſels that have been divided ſhould be encouraged to diſcharge freely: But when the hemorrhagy proceeds too far, it ſhould be reſtrained, by the patient being made to take from time to time a mouthful of ſpirit of wine or tincture of myrrh; or if this does not prove ſufficient, the application of lunar cauſtic to the bleeding arteries will commonly ſucceed.

The ſituation of the ſore renders the application of dreſſings inadmiſſible: For ſome

ſome days, however, after the operation, the mouth ſhould be frequently waſhed with a warm emollient decoction; and afterwards, if a cicatrix does not readily form, the cure may be promoted by the application of lime-water, port-wine, tincture of roſes, and other aſtringents.

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SECTION VII.

Of Looſe Teeth.

THE teeth ought naturally to continue firm till they become looſe by the ordinary effects of old age: But they are liable to diſeaſes which render them looſe, and which even make them drop out at early periods of life; and as this is often the cauſe of much diſtreſs and deformity, it becomes frequently an important object with practitioners.

As the teeth may become looſe from various cauſes, all of which require a different method of treatment, I ſhall enumerate the moſt material, and at the ſame time ſhall point out thoſe means of cure which ſeem to be beſt adapted for each of them.

The

The teeth are frequently looſened by external violence; by falls and blows: and often by an improper uſe of inſtruments in pulling the contiguous teeth.

Teeth looſened in this manner, can be made faſt only by being kept for ſome time firmly in their ſituation; which may be done by preſſing them as far into the ſocket as they will go, and fixing them with ligatures of Indian-weed, catgut, or waxed ſilk, to the contiguous teeth, and feeding the patient upon ſpoon-meat till they become firm.

In youth, when teeth are looſened by external violence, as the ſockets at this age are complete, they readily become firm again when kept a due time in their ſituation with ligatures: Nay, even when forced entirely out of the ſockets, they will ſoon become firm, if they are immediately replaced and retained in their ſituation. I have in ſeveral inſtances put this method of treatment ſucceſsfully in practice, and no harm can reſult from the trial. But in old age, whatever

may

may be the cauſe of teeth becoming looſe, the chance of their ever becoming firm is exceedingly ſmall; ſo that in advanced periods of life, it ought never perhaps to be adviſed.

The teeth ſometimes become looſe from thick layers of tartar forming over them and paſſing between their roots and the gums, and in ſome caſes even between their roots and the ſockets. In this caſe, the removal of the cauſe, if it has not ſubſiſted long, will commonly remove the effect. That the operation, however, may prove effectual, the tartar ſhould be completely ſcaled off, and it ought to be done early; for the longer the teeth remain looſe, the leſs chance there is of their ever again becoming firm.

In ſome inſtances, they become looſe from the gums having acquired a ſpongy ſoftneſs, and ſeparating not only at their necks, but often a conſiderable way down, from the roots. This is ſometimes the effect of a long-continued courſe of mercury; but it is commonly, although often improperly,

improperly, ſuppoſed to proceed from ſcurvy: We no doubt meet with it as a ſymptom of real ſea-ſcurvy; but this is a very uncommon diſeaſe at land; while the other, namely, a ſoft ſpongy ſtate of the gums, is frequently met with.

When, however, it proceeds from a general ſcorbutic ſtate of the ſyſtem, nothing but the removal of this will accompliſh a cure; but when entirely local, topical remedies are alone to be truſted. When teeth have remained long looſe, we can never with certainty ſay that any means we can uſe will render them firm; but the moſt effectual remedy that hitherto has been employed, is a frequent ſcarification of the gums both in the outſide and inſide of the looſe teeth. The inciſions ſhould be carried deeply into the ſubſtance of the gums: They ſhould be allowed to diſcharge freely, and repeated from time to time, as long as any of the teeth remain looſe. In this manner, that ſpongy ſtate of the gums that I have deſcribed,

ſcribed, is often removed, and a diſpoſition produced in them to adhere to the inveſting membrane of the teeth, by which they often become firm and healthy.

With a view to remove this ſpongy ſtate of the gums, aſtringents are commonly preſcribed; but I have ſeldom known any advantage enſue from them: On the contrary, a frequent uſe of them ſeems to do harm, by inducing a diſpoſition in the gums, that deprives them for ever of the power of adhering to the parts beneath: At leaſt, I have met with different inſtances where this was evidently the caſe; in which by a long-continued uſe of aſtringents, the gums became ſo hard and firm, that the ſcarifications afterwards employed had no effect in fixing them. They ſhould not therefore be uſed till adheſion takes place between the gums and teeth, either by means of ſcarifications, or in ſome other manner; and this being accompliſhed, they may be employed with freedom, and even with advantage. The

remedies

remedies of this claſs that are moſt to be truſted, are, tinctures of Peruvian bark, and of oak-bark, tincture of myrrh, and a ſtrong ſolution of alum. The mouth ſhould be frequently waſhed with cold water, ſtrongly impregnated with any of theſe, at the ſame time that the patient ſhould be deſired not to uſe the looſe teeth, till they have for ſome time been perfectly firm.

The teeth ſometimes become looſe by abſceſſes forming between their roots and the alveoli; eſpecially when the alveoli, from being thus immerſed in matter, at laſt become carious: But this having already been minutely treated of in the fourth ſection of this chapter, when ſpeaking of gum-boils, I muſt now refer to what was then ſaid upon it.

It is ſcarcely neceſſary to mention the looſening of the teeth that occurs in old age; for this takes place from a cauſe for which there is no remedy: Not from the roots of the teeth decaying, or from their

their being puſhed out of their ſockets, but from a real annihilation of the ſockets; probably in conſequence of the oſſeous matter of which they are compoſed being abſorbed, while nature having now no uſe for teeth, does not continue to ſupply it.

SEC-

SECTION VIII.

Of CLEANING *the* TEETH.

THE teeth are apt to become foul from different cauſes, and frequently require the aſſiſtance of a dentiſt to render them clean.

1. They ſometimes loſe their natural healthy colour, and acquire a duſky yellow hue: Or they become to a certain degree black, without any adventitious matter being perceptible on any part of them.

2. At other times they become foul, and give a diſagreeable putrid taint to the breath, merely from a too long remora of the natural mucus of the mouth.

3. But the moſt frequent cauſe of foul teeth is a calcareous matter that forms on them, commonly termed the Tartar of the

Teeth, which ſeems to be a depoſition from the ſaliva, as calculi in the bladder are from the urine. Few people are entirely exempted from this; but ſome are much more liable to it than others, inſomuch, that I have known different inſtances, of the teeth becoming thickly incruſtated with it in the courſe of a few weeks after having been completely freed from it.

Tartar firſt appears in the fore-teeth, and in thoſe parts of them that are leaſt liable to be rubbed by the tongue or lips. Hence it is firſt perceived on the outſide, in the angles between two of the teeth, near to the junction of the gums. The ordinary effects of maſtication prevents it in general from ſpreading towards the points of the teeth: but the diſpoſition to form it is in ſome conſtitutions ſo great, that I have known it proceed from the gums upwards even over the flat ſurfaces of the grinders; and in ſuch inſtances, when not removed, it is apt to ſpread over the whole teeth, and to give the appearance of a continued

tinued incruſtation from one end of the jaw to the other. In ſome caſes again, inſtead of paſſing over the whole, it ſeems to fix more particularly on one or two of the teeth; and in ſuch inſtances, the depoſition of this matter goes on ſo quickly as to give cauſe to ſuſpect that the whole calcareous matter of the mouth is by ſome cauſe or other attracted to this particular point. I have known one or two teeth completely covered with it in the ſpace of a few weeks, while none of it formed in any other part of the mouth. In ſome theſe partial incruſtations are ſo large as to diſfigure the external appearance of the cheek; and, by thoſe not accuſtomed to this branch of practice, they are ſometimes miſtaken for diſeaſes of a worſe nature: they have even been treated as exoſtoſes ariſing from the jaw-bone.

While the tartar conſiſts of a thin ſcale only, and as long as it is confined to the external ſurface of the teeth, and does not prove hurtful to the gums, it ſeldom meets with much attention: But when

it forms in any conſiderable quantity, it very commonly hurts the gums, by producing ſlight ulcerations upon thoſe parts to which it lies contiguous; or, it inſinuates between the gums and the alveoli, ſo as to ſeparate them to a conſiderable depth from each other. In either of theſe events, thoſe means ſhould be employed by which we know that it will be moſt effectually removed.

When the teeth have remained long covered with any kind of extraneous matter, if it has acquired any degree of firmneſs, it cannot be removed but with the help of inſtruments. Even a ſlight diſcolouring, although not attended with any perceptible covering of an adventitious matter, when of long continuance, can ſeldom be removed in any other way. But when once the teeth are thoroughly ſcaled with inſtruments, they may in general be preſerved in this ſtate by moderate friction with a bruſh. Frequent waſhing with cold water; and rubbing every ſecond or third morning with burnt bread; Peruvian

vian bark; cream of tartar; chalk or any other mild ſubſtance in fine powder, will for the moſt part keep them clean and white: But this we muſt obſerve is not univerſally the caſe; for the tendency I have mentioned to foulneſs of the teeth, eſpecially to a depoſition of tartar, is in ſome inſtances ſo great, that the greateſt pains and attention does not prevent the renewal of it. This, however, is not frequent; for it is well known, that due attention to cleanlineſs will very generally prevent every formation of this kind.

I have ſaid, that when once the teeth have become foul, they cannot be cleaned but with the help of inſtruments. This is at leaſt the beſt, as it is the ſafeſt and ſureſt method. Rubbing the teeth with acids of a certain ſtrength, will indeed render them white; for the tartar and other kinds of matter that adheres to them being ſoluble in acids, a frequent uſe of them removes it completely; and we accordingly find, that acids of one kind or another form the baſis of almoſt every

waſh that has been advertiſed for the teeth. The public, however, ſhould be much on their guard againſt the uſe of theſe applications; for the teeth themſelves are very apt to be hurt by acids, inſomuch that it is perhaps impoſſible to employ acids of a ſufficient ſtrength for diſſolving any extraneous matter upon them, that will not at the ſame time prove injurious to the enamel. Every one knows, that even the mildeſt vegetable acid will render the teeth rough, and ſet them on edge: We may therefore ſuppoſe, that thoſe of a ſtrong nature, the mineral acids, very commonly uſed by itinerants for this purpoſe, muſt prove much more hurtful; and in fact many have loſt their teeth entirely by the uſe of them.

It is indeed ſaid by many, that in cleaning the teeth with inſtruments, harm is apt to be done, by hurting the enamel. This I believe has in ſome inſtances happened: But it ſhould not be conſidered as the fault of the remedy, but of the manner of uſing it. A ſharp inſtrument may no doubt be

ſo

ſo improperly applied, as to remove the enamel; but this muſt always be the fault of the operator: For every incruſtation to which the teeth are liable may be taken off with ſafety, and without hurting the teeth.

In Plate LVIII. inſtruments of various forms are repreſented for this operation. Figs 2. 3. and 4. are the beſt, and will anſwer for moſt purpoſes; but the others are ſometimes neceſſary for the removal of ſuch parts of the incruſtation as form between the teeth. They ſhould all be moderately ſharp, otherwiſe the operation is done with difficulty; but the edge of none of them ſhould be fine, otherwiſe it will be apt to turn, and even to break, with the force neceſſary for ſcaling off the tartar.

In performing this operation, the patient ſhould be placed upon a low ſeat, with his face oppoſite to a clear light, and his head ſupported by an aſſiſtant. The ſurgeon himſelf ſhould be ſeated upon a chair ſomewhat higher. It is commonly indeed done while the operator is ſtand-

ing; but I have in different parts of this work had occaſion to remark, that ſurgeons ought to ſit at every operation when it can with propriety be done.

The ſurgeon ſhould now wrap the fore-finger of his left hand in a wet cloth, with which he ſhould preſs firmly upon the point of the tooth intended to be firſt cleaned, while the back-part of the ſcaling inſtrument will form a point of reſiſtance for the thumb of the ſame hand. In this manner the tooth may be firmly ſupported, ſo as to prevent every riſk of its being looſened by the inſtrument. This in every caſe is a neceſſary precaution; more eſpecially when any of the teeth are looſe.

The ſharp edge of the inſtrument is now to be inſinuated beneath the under-part of the incruſtation, care being taken to avoid the neck of the tooth, otherwiſe, if puſhed down this length, and if much force is employed, the tooth will either be looſened, or perhaps turned entirely out. On being certain that the inſtrument is properly placed,

ced, it muſt be puſhed with firmneſs from below upwards to the top of the tooth, and repeatedly applied in this direction till all the incruſtation is removed; and one tooth being cleaned, all the reſt that require it muſt be treated in the ſame manner. This being done, the teeth ſhould all be well rubbed over with a bit of ſponge in the form of a bruſh, covered with a fine powder prepared of equal parts of cream of tartar and Peruvian bark; and this being continued from time to time, further aſſiſtance will ſeldom be required: But if, notwithſtanding of this, the teeth ſhall again become foul, any new incruſtation muſt be ſcaled off in the manner I have mentioned.

This is the beſt and moſt effectual method of cleaning the teeth when they become foul from extraneous matter having formed on them; but they ſometimes loſe their colour, as I have already obſerved, and acquire a kind of foulneſs, when no incruſtation is perceived on them: Even in this caſe, as long as the ſurface of the teeth

teeth remains ſmooth and ſound, moderate friction with the edge of a ſcaling inſtrument will frequently prove uſeful; and if the operation is done with caution, no riſk will accrue from it. But when the teeth become black from this cauſe, we ſometimes find the enamel corroded, or perforated as it were with an infinite number of ſmall holes; and this, I muſt obſerve, is the worſt kind of foulneſs to which they are liable: For it is difficult to remove, and when removed, it in general ſoon returns, nor does it commonly ſtop till all the teeth which it attacks are deſtroyed.

As this kind of foulneſs cannot always be removed with inſtruments, we endeavour to diſſolve it with ſome chemical preparation. All the mineral acids will do it in the moſt effectual manner; but for the reaſons I have given, they ought never to be uſed. I have commonly employed ſaponaceous, or even pure alkaline applications; by which the teeth may be often rendered perfectly clean without any injury being done to them. A ſtrong lather

of

of common ſoap will often anſwer; and a ſolution of ſalt of tartar applied over the teeth with a ſmall pencil or bruſh, proves in ſome inſtances equally ſucceſsful.

When in this manner the foulneſs is removed, the moſt effectual means for preventing a return of it, is to waſh the teeth frequently with cold water, and to rub them from time to time with one of the powders that I have mentioned. I have ſometimes, too, thought, that repeated applications of tincture of Peruvian bark have ſerved to prevent it. As this variety, indeed, of foul teeth ſeems to depend upon ſome degree of putreſcency; for it is evidently attended with a caries or mortified ſtate of the diſeaſed teeth; there is cauſe to imagine that antiſeptics of every kind would prove uſeful in the method of cure.

For the purpoſe of applying powders and other applications to the teeth, bruſhes of different forms, and various kinds of roots properly prepared, are daily uſed. Lucerne and alkanet roots dried and beat

at

at one end into the form of a bruſh, are much employed for it, and they may be uſed both with ſafety and advantage for cleaning the interſtices between the teeth: But neither theſe, nor any kind of bruſh ſhould be employed for rubbing the roots of the teeth and upper parts of the gum; for as their points paſs between the gums and the ſockets, they are apt to ſeparate the one from the other, from which much miſchief is apt to enſue. For this reaſon, I always employ a piece of ſponge fixed in a ſmall handle, which may be uſed with entire ſafety.

END OF VOLUME FOURTH.

PLATE XII.

Fig. 1.

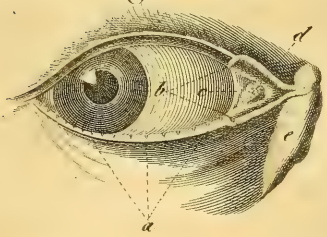


Fig. 2.

Fig. 3.

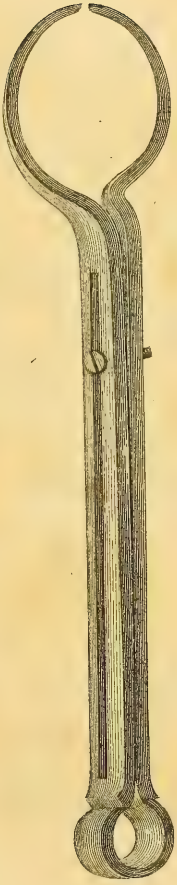


Fig. 4.

D.Lizars Sculp

PLATE XIII.

Fig. 1.

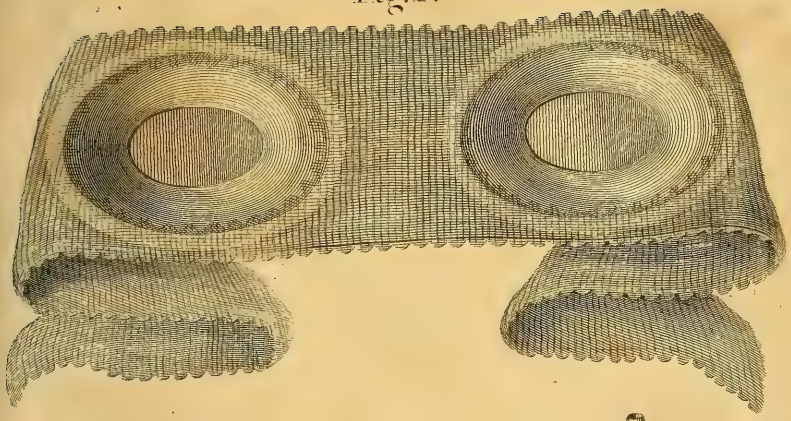


Fig. 4.

Fig. 2.

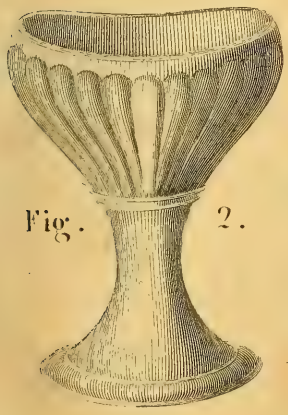


Fig. 3.

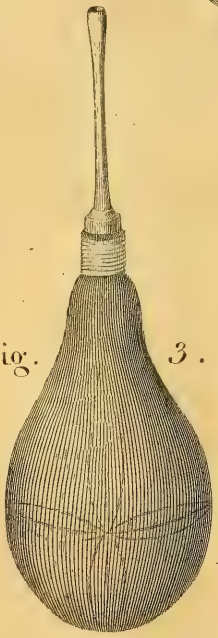
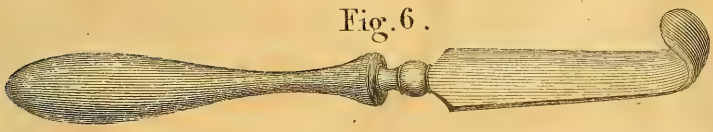


Fig. 5.

Fig. 6.



D Lizars Sculp.

PLATE XIV.

Fig. 1.

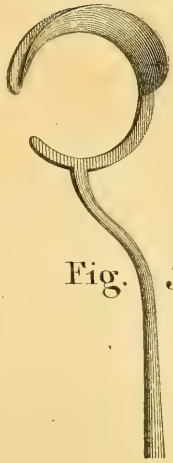
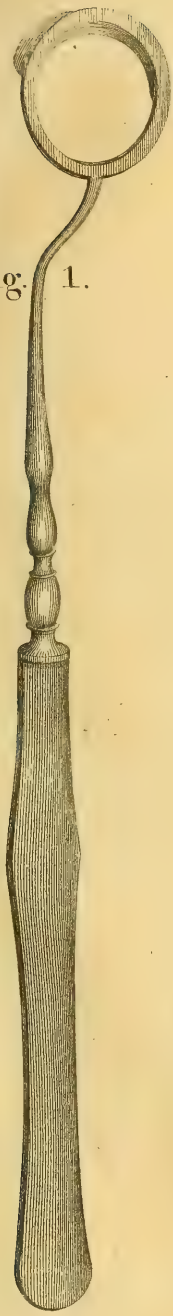


Fig. 3.

Fig. 2.

Fig. 4.



D.Lizars Scrolp.

PLATE XV.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

PLATE XVI.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Mercier Sculp.

PLATE XVII.

Fig.1.

Fig.2.

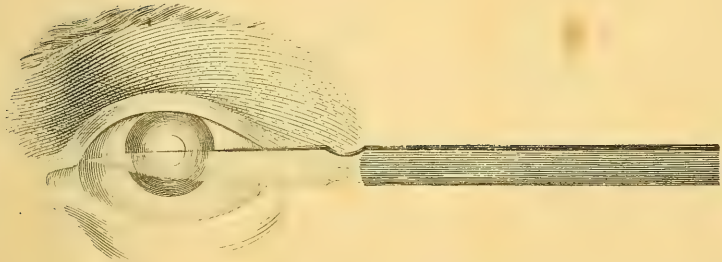
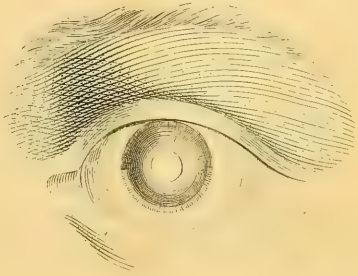


Fig.3.

Fig.4.



Dixons Sculp

PLATE XVIII.

Fig. 1.

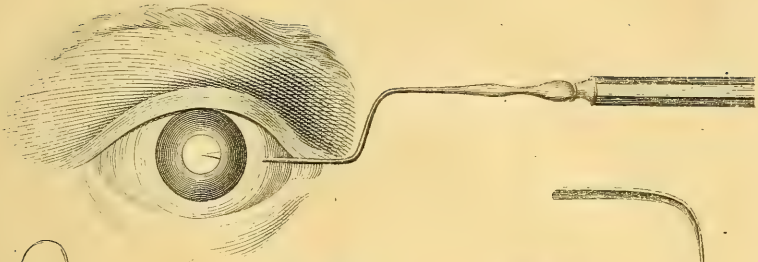


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Warren, sculp

PLATE XIX.

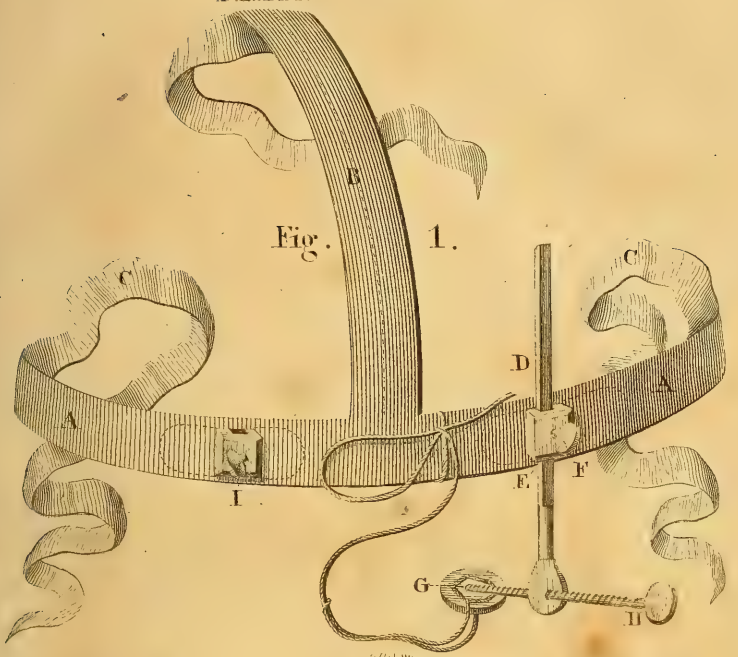


Fig. 1.

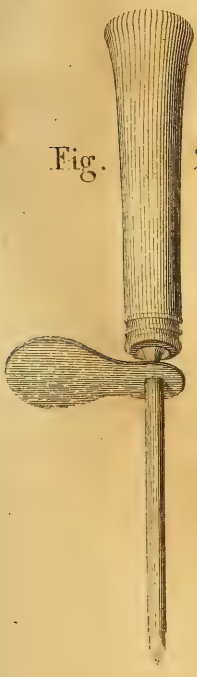


Fig. 2.

Fig. 5.

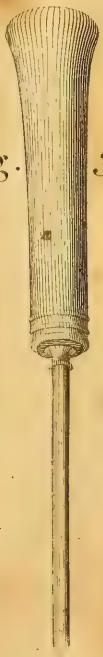


Fig. 3.

Fig. 4.

DLizars Sculp.

PLATE XX.

Fig. 1.

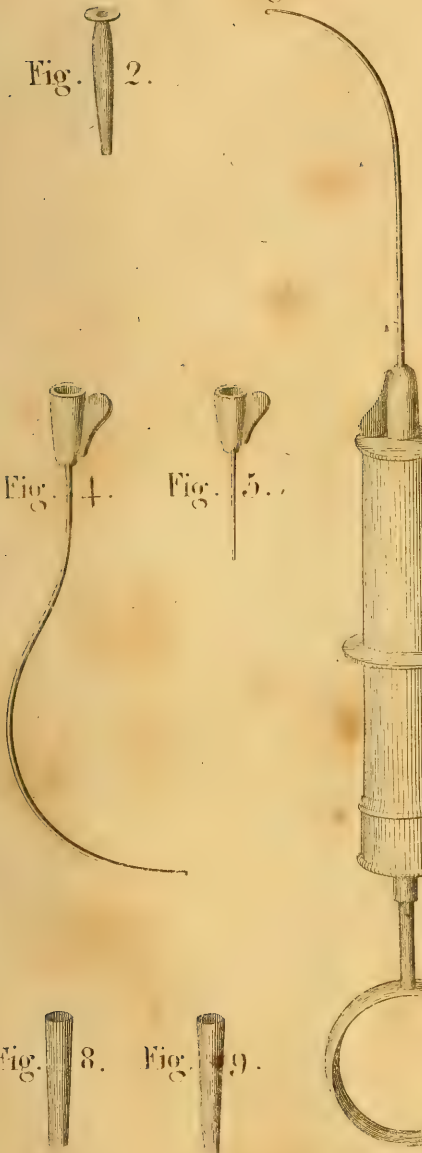


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

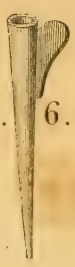


Fig. 7.

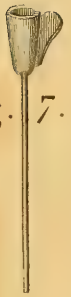


Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

PLATE XXI.

Fig. 2.

Fig. 1.

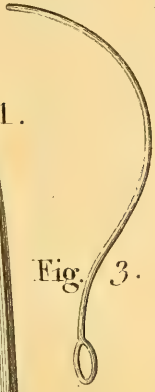


Fig. 3.

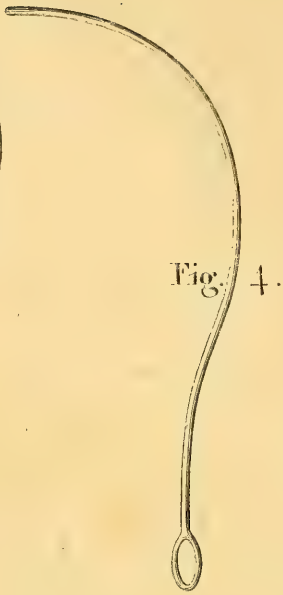


Fig. 4.

Fig. 5.

Fig. 6.

Wixes Sculp

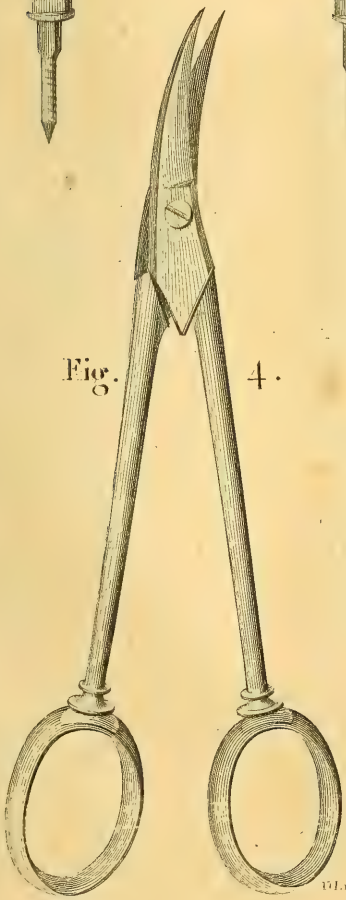
PLATE XXII.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.



A

Fig. 5.

B

PLATE XXII.

Fig. 1.

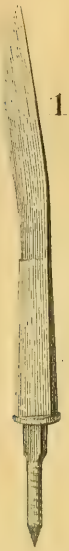


Fig. 2.

Fig. 3.

Fig. 4.

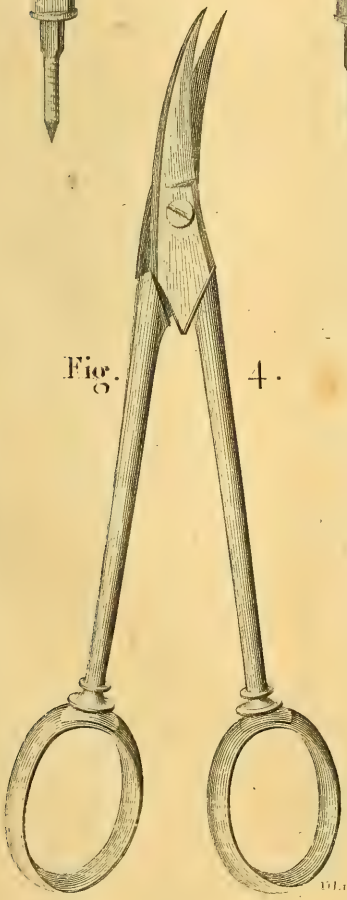
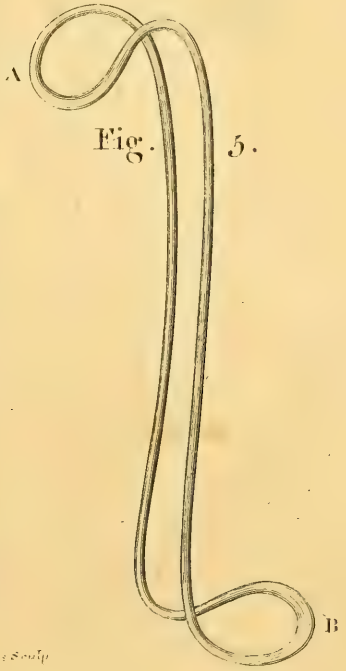


Fig. 5.

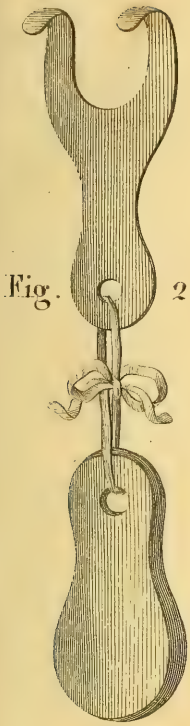


Blaeus Sculp

PLATE XXIII.

Fig. 1.

Fig. 2.



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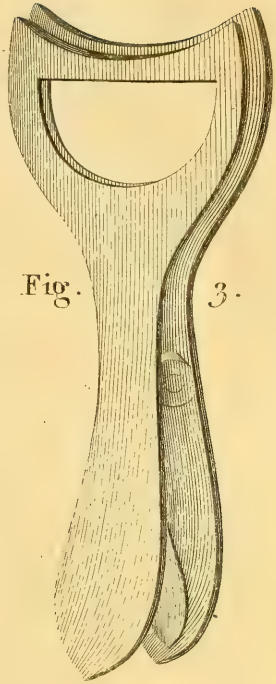


Fig. 4.

Fig. 5.

PLATE XXIV.

Fig. 1.

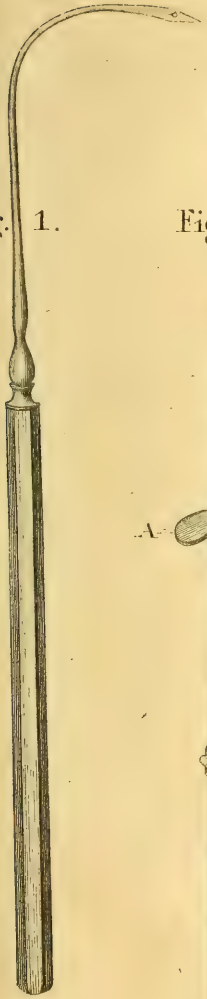
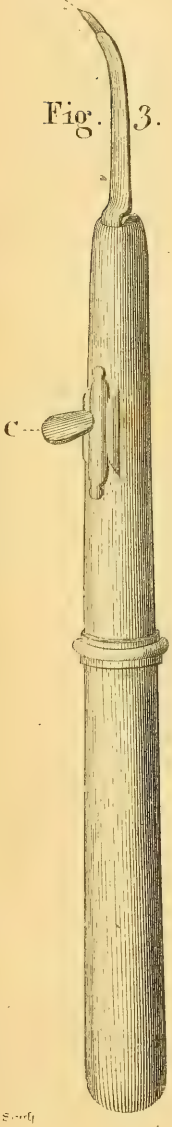


Fig. 2.

Fig. 3.



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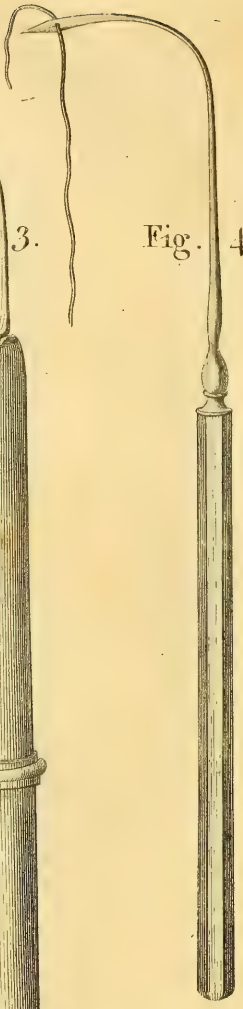


PLATE XXV.

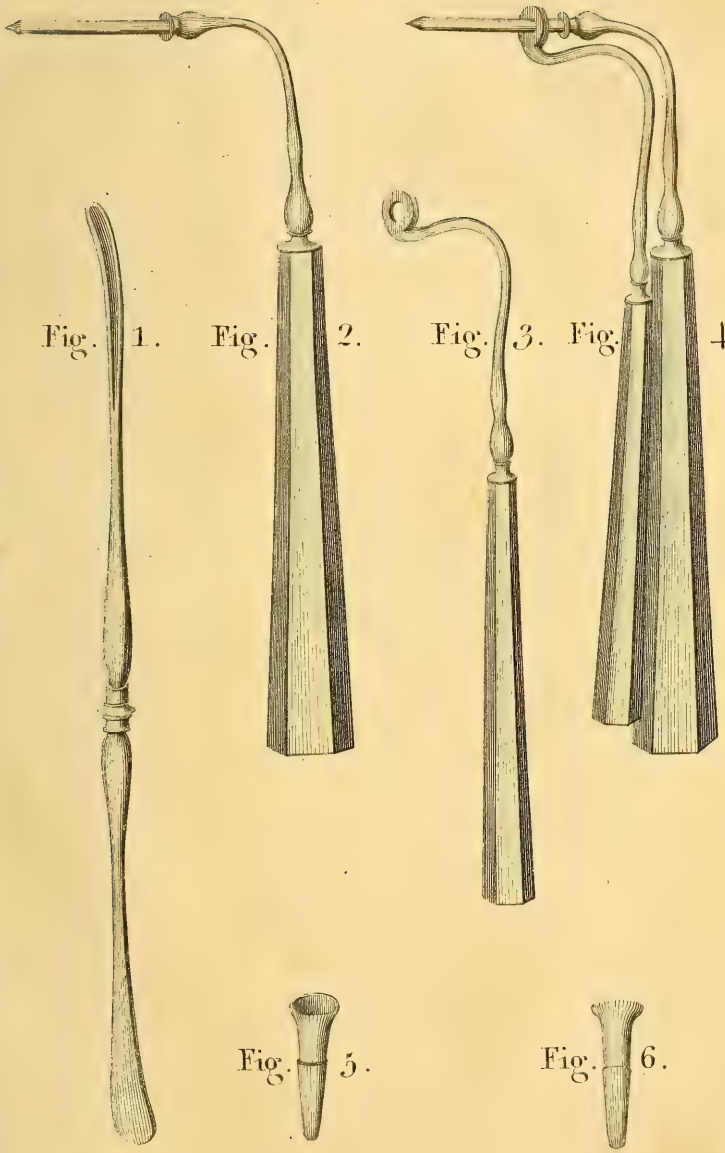


Fig. 1.

Fig. 2.

Fig. 3.

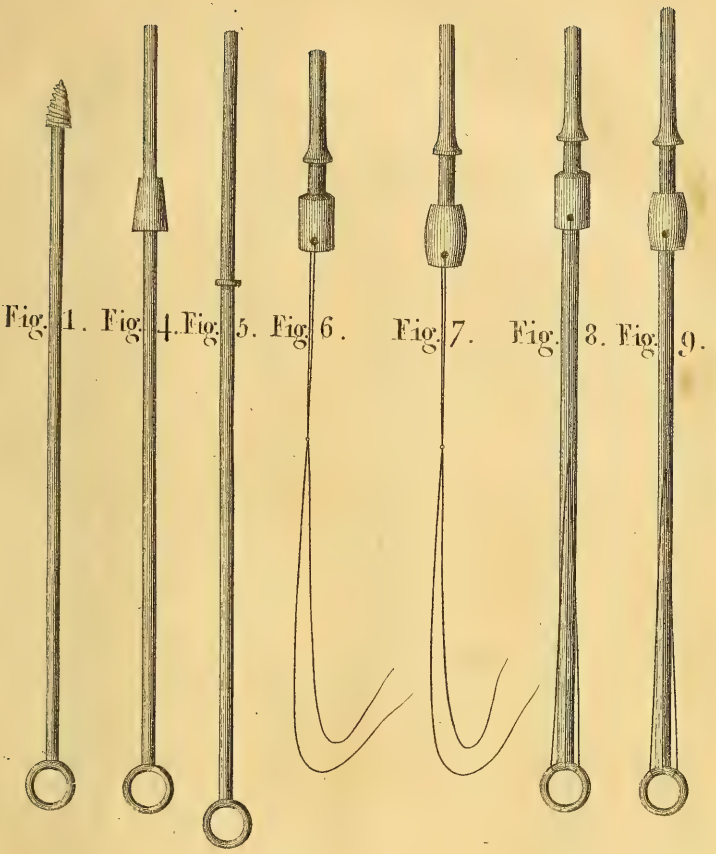
Fig. 4.

Fig. 5.

Fig. 6.

Blazers sculp

PLATE XXVI.



Blazers Sculp

PLATE XXVII.

Fig. 1.

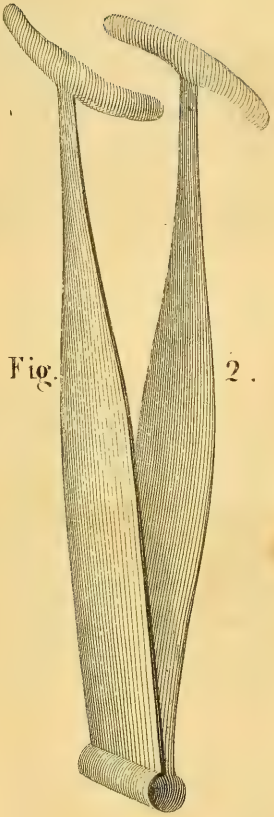
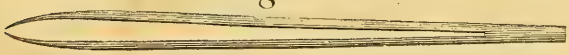


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.



Waters, Sculp.

PLATE XXVIII.

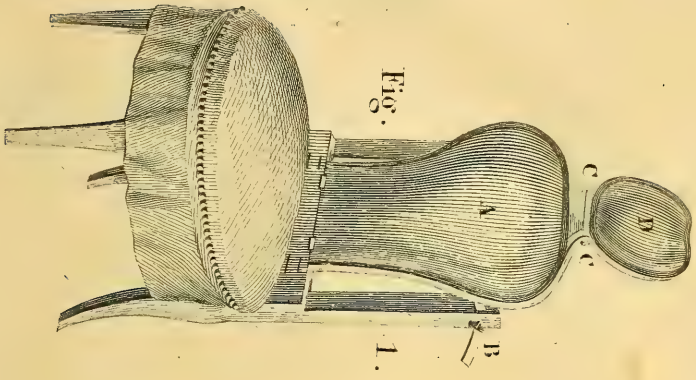


Fig. 1.

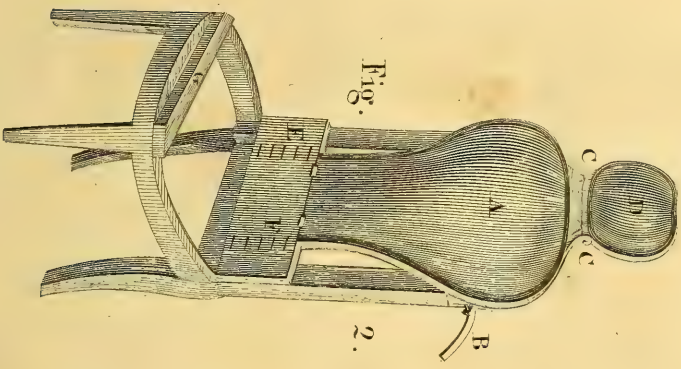


Fig. 2.

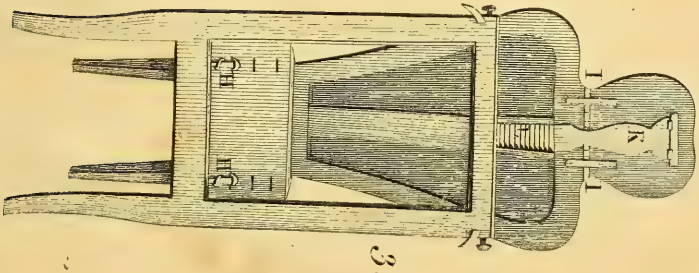


Fig. 3.

D.Lizars Sculp.

PLATE XXIX.

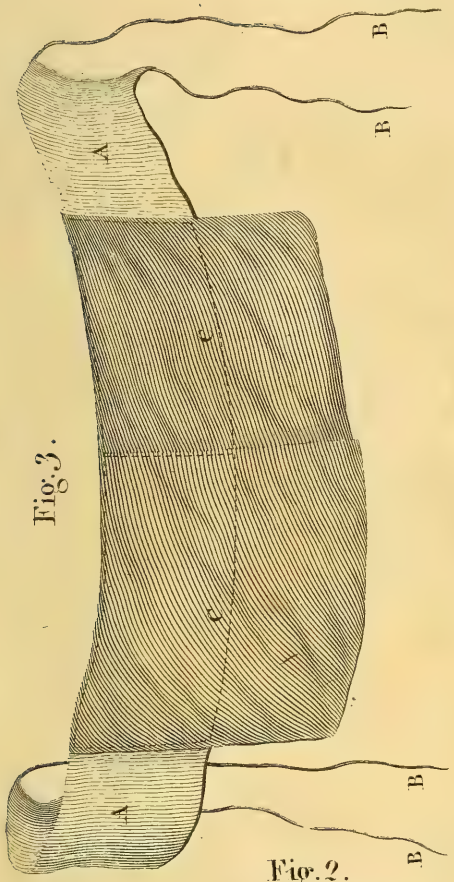


Fig. 3.

Fig. 4.

Fig. 2.

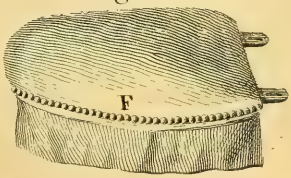


Fig. 1.

Fig. 1.

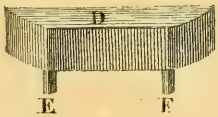


PLATE XXX.

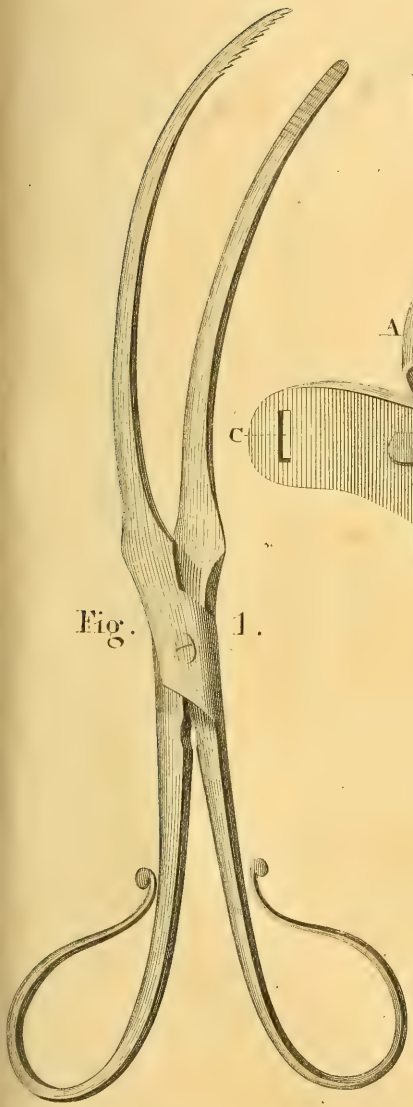


Fig. 1.

Fig. 2.

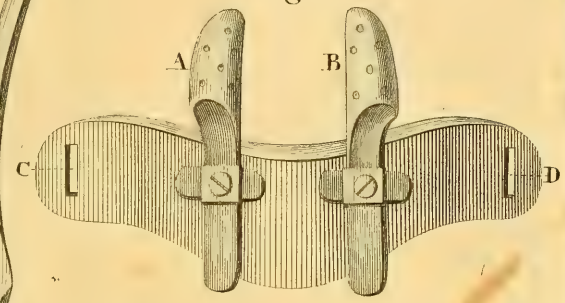


Fig. 3.

Fig. 4.

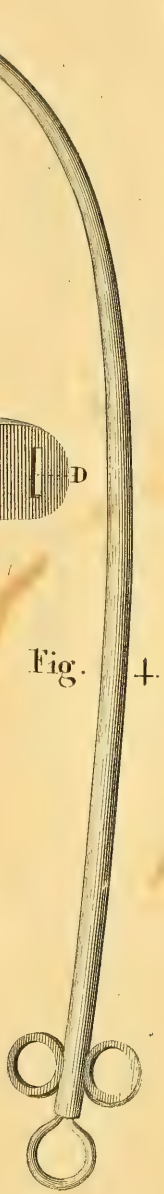


PLATE XXXI.

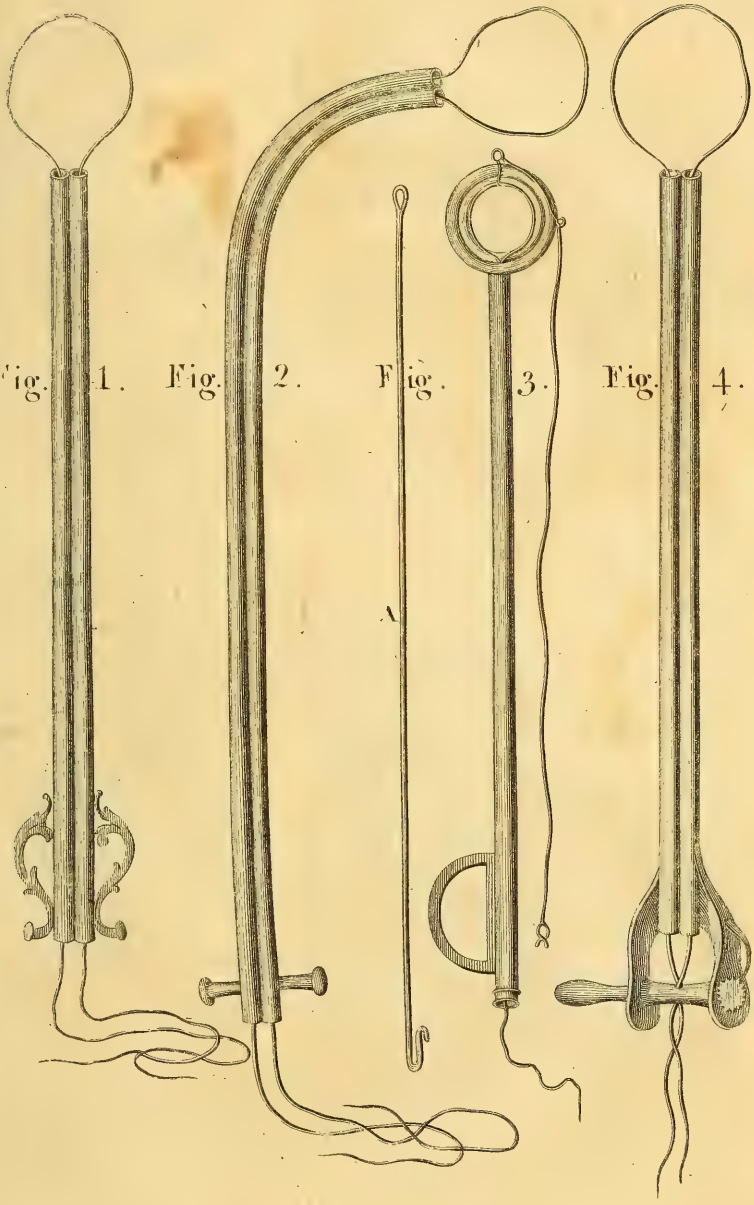


PLATE XXXII.

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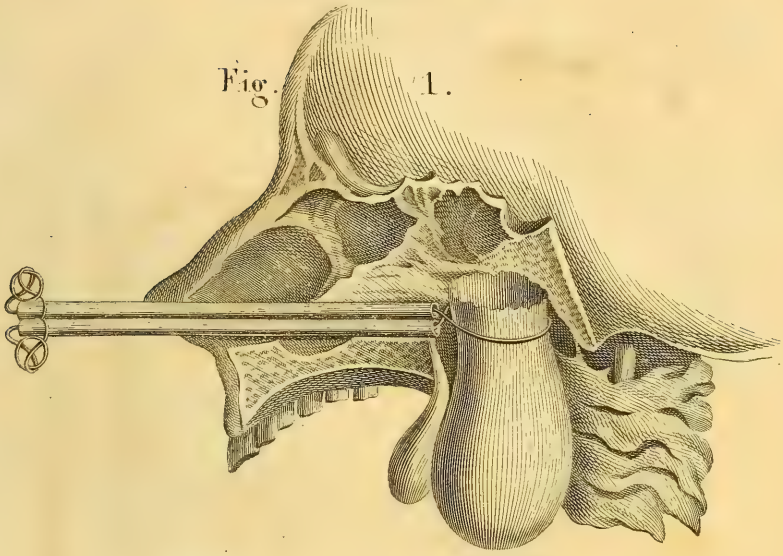


Fig. 2.

Blazer Sculp

PLATE XXXIII.

Fig. 1.

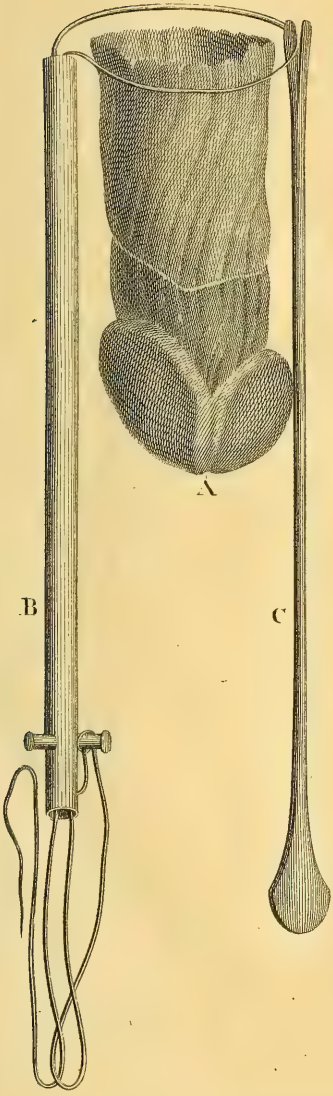
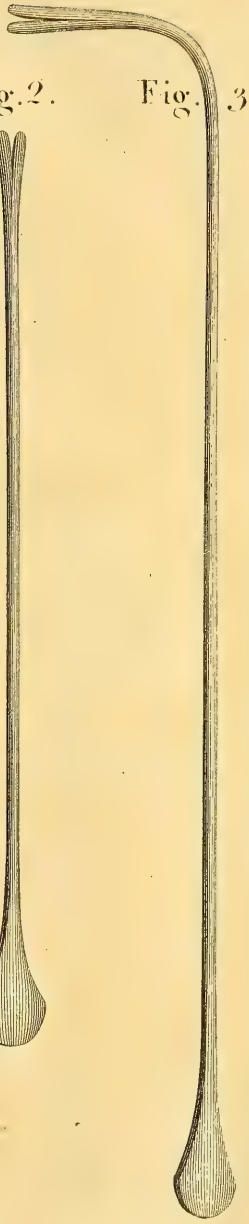


Fig. 2.

Fig. 3.



D.Lizars Sculp

PLATE XXXIV.

Fig. 1.

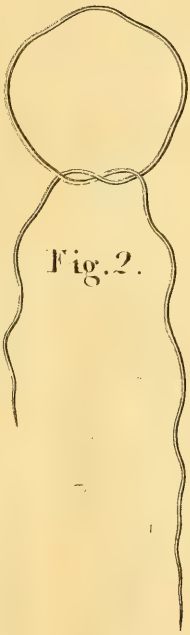


Fig. 2.

Fig. 3.

Fig. 4.

Blizard Sculp

PLATE XXXV.

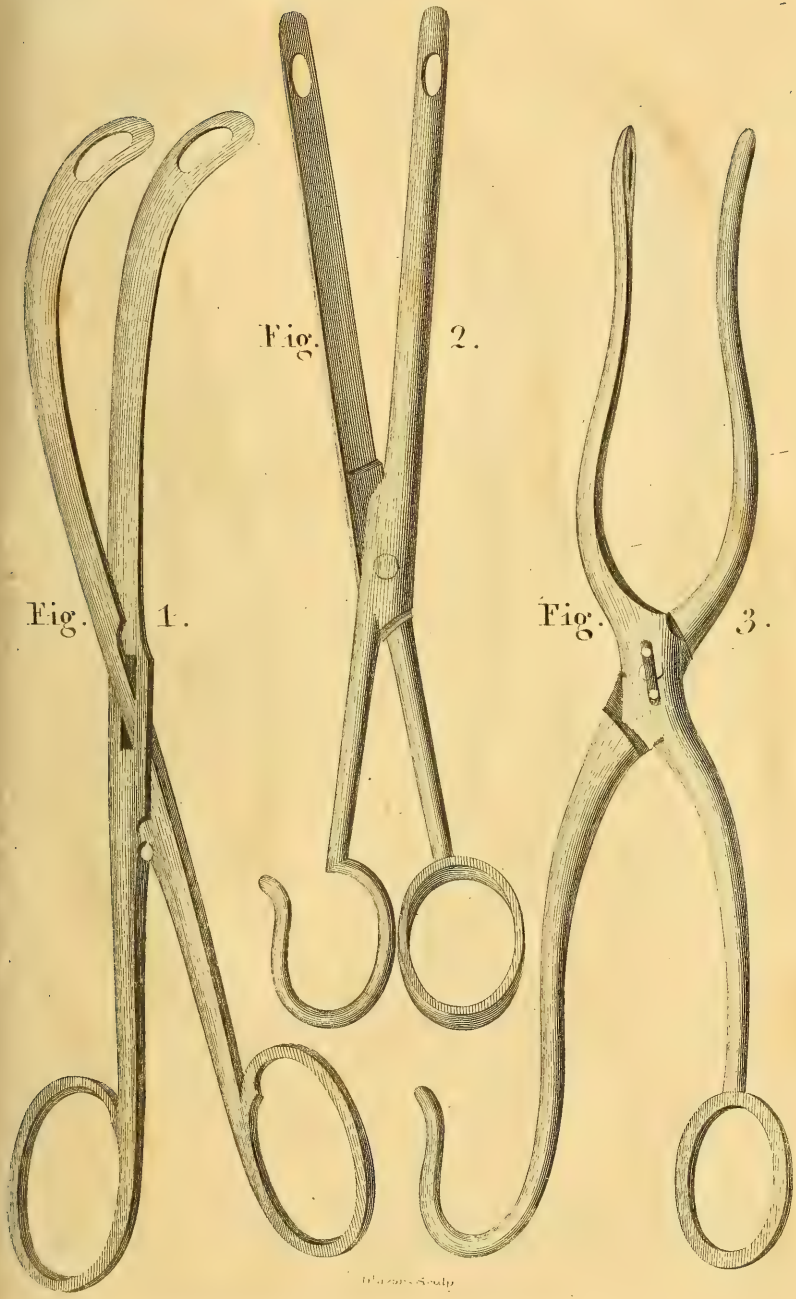


Fig. 1.

Fig. 2.

Fig. 3.

PLATE XXXVI.

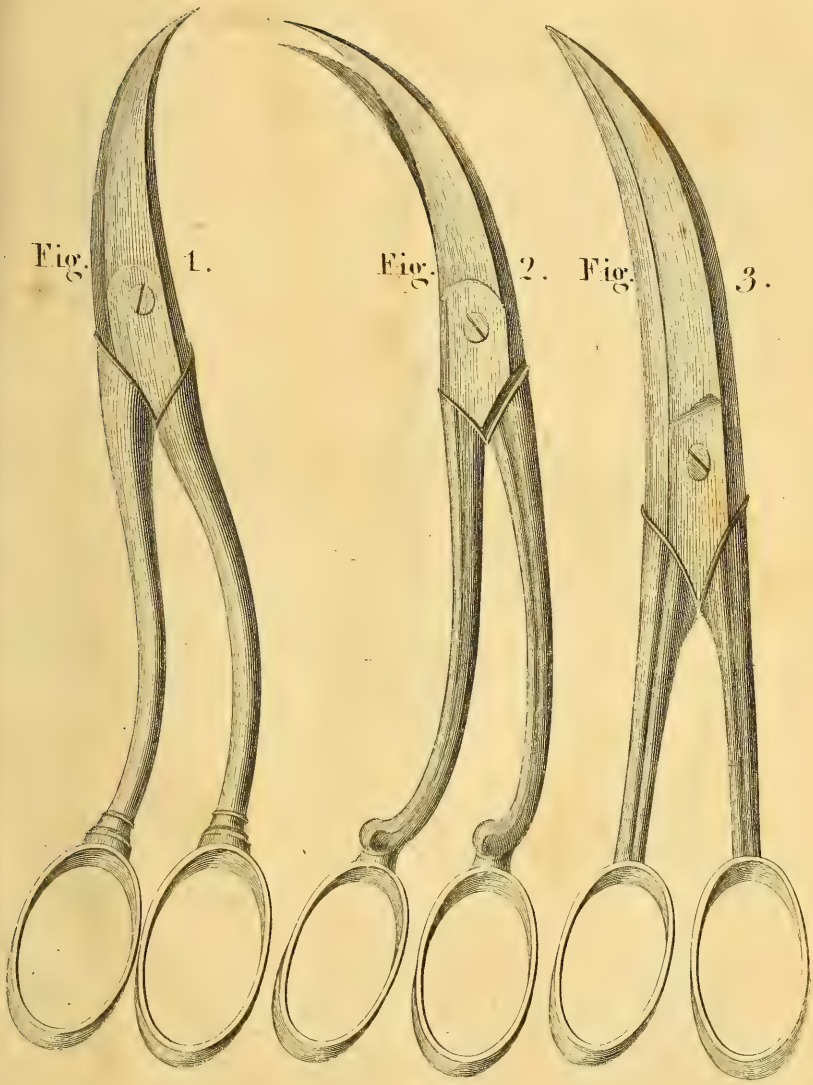


Fig. 4.

PLATE XXXVII.

Fig. 1.

Fig. 2.

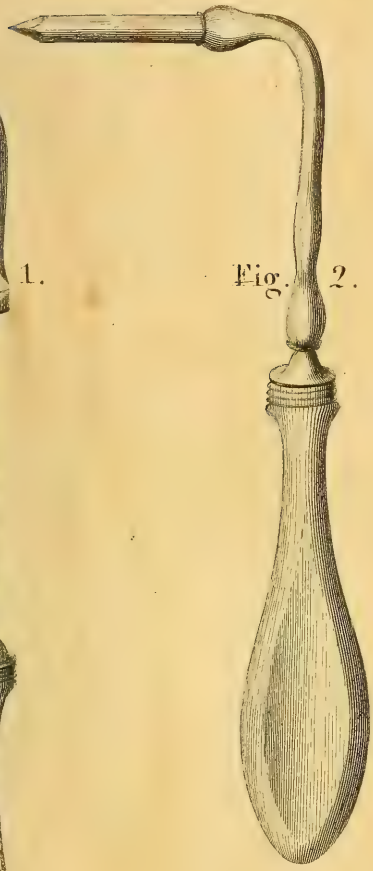
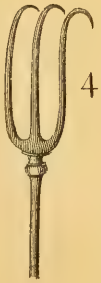


Fig. 3.

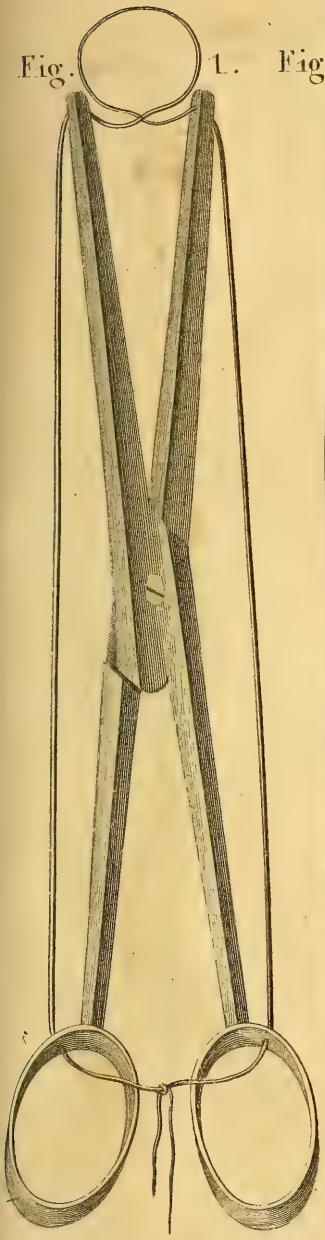
Fig. 4.



Blazeman Sculp

PLATE XXXVIII.

Fig. 1.



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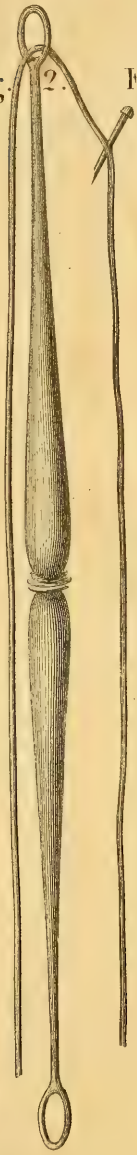

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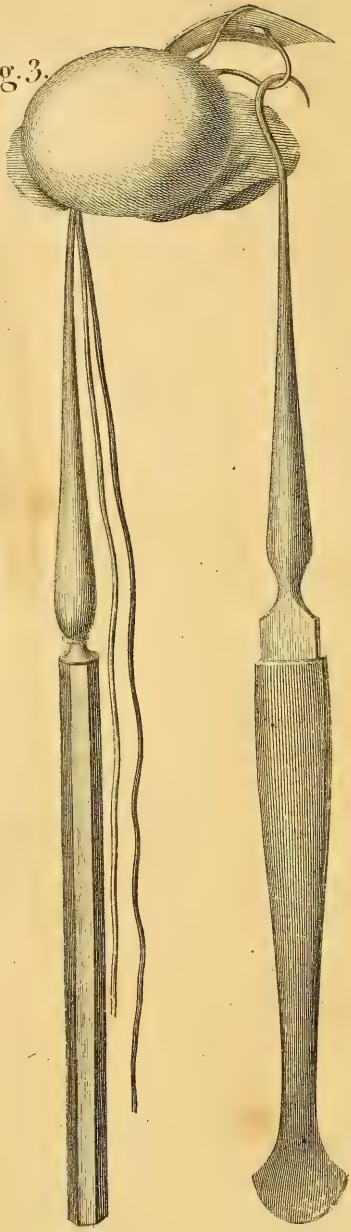
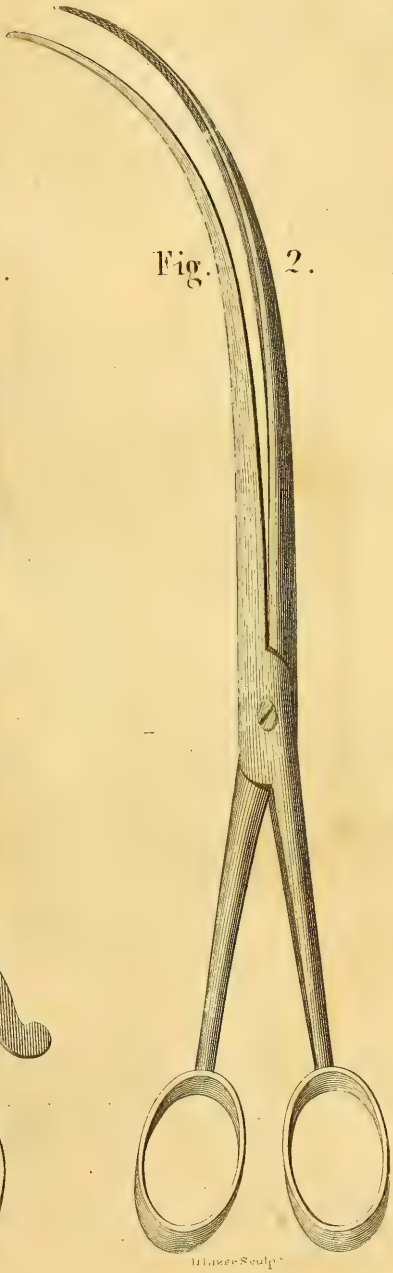


PLATE XXXIV.

Fig. 1.

Fig. 2.



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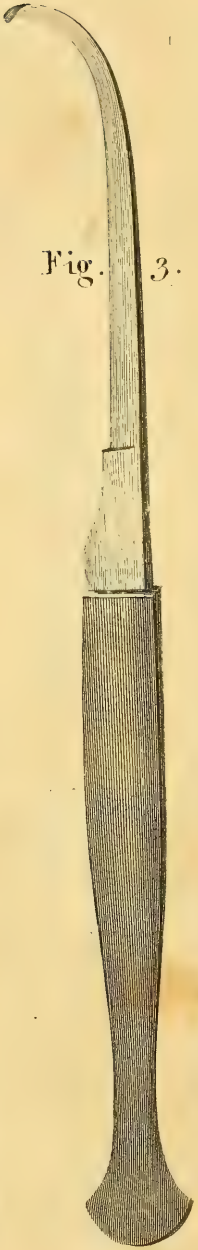

PLATE XL.

Fig. 1.

Fig. 2.

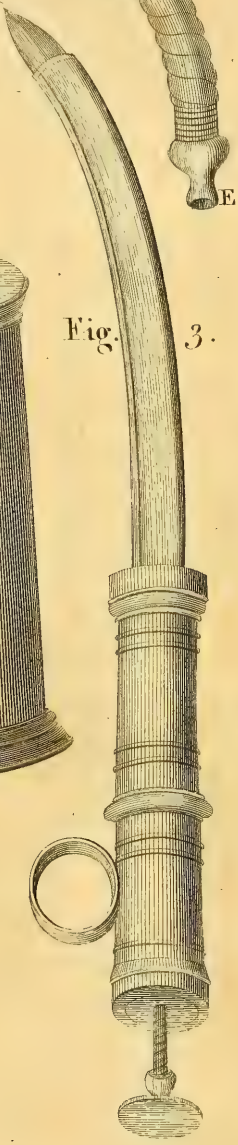

Fig. 3.

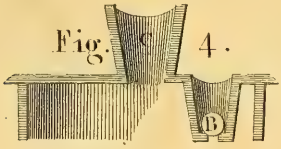

Fig. 4.

EXPLANATION

OF THE

PLATES.

PLATE XII.

Fig. 1. A Delineation of ſome parts of the eye, referred to in different parts of Chapter XI *.

a, Theſe points repreſent the openings or orifices of the glands of Meibomius; by which, a viſcid glutinous ſubſtance, commonly termed the Gum of the Eyes, is ſeparated and diſcharged.

d, The caruncula lachrymalis.

c, The

* Vide Deſcriptionem Anatomicam Oculi, Iconibus illuſtratam. Auctore Johanne Getfreid, Zinn. M. D.

c, The membrana ſemilunaris, which ſeems to have ſome effect in directing the tears towards the puncta lachrymalia *b*, from whence they are conveyed by their correſponding ducts into the ſaccus lachrymalis *e*, and afterwards to the noſtril by the naſal duct.

In the cure of the fiſtula lachrymalis, it is of much importance to be well acquainted with the anatomy of theſe parts; of which this delineation will convey a more exact idea than could be given by deſcription.

Fig. 2. A ſharp-pointed inſtrument, from its figure termed a Haſta, by which the eye may be fixed in extracting and couching the cataract; but it does not anſwer the purpoſe ſo well as different inſtruments to be hereafter deſcribed.

Fig. 3. A ſpeculum oculi in common uſe, but it does not fix the eye ſo well or ſo eaſily as the ſpeculum delineated in Plate XIV. or the inſtrument, fig. 5. Plate XXII.

Fig.

Fig. 4. A very uſeful form of knife for various operations on the eye-ball and eyelids, particularly for cutting or ſcarifying turgid bloodveſſels on the eye: A lancet is commonly uſed for this; but this knife is uſed with more ſteadineſs, and being round or blunt on the back, it does not ſo readily injure the contiguous parts.

Plate XIII.

Fig. 1. A bandage for the eyes, uſually termed gogles, by which any quantity of light can be admitted that a patient may wiſh for, while, at the ſame time, the eyes are ſufficiently protected, without being kept too warm, or too cloſely tied down, as is commonly done with the bandages uſually employed. It conſiſts of two pieces of poliſhed timber, excavated into the form of cups, but open at both ends, and correſponding to the ſize of the eyes for which they are intended: And theſe being covered with black or green gauze, they are fixed by the riband tied round the head.

Fig.

Fig. 2. A cup of an oval form, for the purpoſe of bathing the eyes either with water or any other liquid. Being of an oval form correſponding to the ſize and figure of the orbit, the eye can be more effectually waſhed or bathed in any liquid contained in it than in any other manner.

Fig. 3. A bag of reſina elaſtica, fitted with an ivory pipe for the purpoſe of injecting warm water between the eyelid and ball of the eye, in order to remove ſand, lime, or any other extraneous matter that happens to be lodged between them.

Figs. 4. and 5. Pipes of different forms, that may be occaſionally fitted to one of theſe bags.

Fig. 6. A flat-hook, either of poliſhed ſilver or ſteel, for ſeparating the eyelids from each other. This is commonly done by the fingers of the operator, or by an aſſiſtant; but in many of the more minute operations on the eye, this kind of flat-hook is employed with much advantage;

vantage: ſo that every ſurgeon in this branch of buſineſs ſhould be poſſeſſed of it.

Plate XIV.

The figures in this plate repreſent different views of an inſtrument frequently mentioned in the courſe of this work. Various forms of a ſpeculum oculi have been delineated in books; but they have ſeldom been uſed in practice. They have in general been found either to compreſs the eye too much, ſo as to induce pain and inflammation; or not to fix it ſufficiently. The inſtrument here repreſented, when properly poliſhed, creates little uneaſineſs, at the ſame time that the eye may be ſo compreſſed with it as to be kept perfectly ſteady. The handle may be either of ſteel or timber, but the reſt of it ſhould be made of ſilver or fine poliſhed ſteel. Operators ſhould be provided with ſpecula of different ſizes. The views here delineated are taken from a ſize that anſwers for moſt part of adults.

A well-adapted ſpeculum is an uſeful inſtrument in many diſeaſes of the eyes, but particularly in the operations of couching and extracting the cataract. Some having imagined, that it may be an advantage to be able to withdraw the ſpeculum while the knife or needle remains in the eye, it has been propoſed to leave a vacant ſpace for this purpoſe in the circle of this inſtrument, which ſurrounds the eyeball, as is repreſented in fig. 3. The ſpeculum ſhould be always kept, however, upon the eye, as long as either the extracting knife or couching needle remains in it, otherwiſe the eye cannot be rendered ſufficiently ſteady: But to thoſe who are of a different opinion, this form of the inſtrument delineated in fig. 3. will anſwer the purpoſe.

Plate XV.

Fig. 1. A couching needle of the beſt form that I have ſeen. It penetrates the eye more readily than the round needle, fig.

fig. 2. and the cataract is more eaſily depreſſed with it.

Fig. 3. A needle of a flat form, ſimilar to fig. 1., with a ſmall curve near to the point. With this curve I have ſometimes found that the cataract is more eaſily depreſſed than with a ſtraight needle; but I have not yet uſed it ſo frequently as to be able to ſpeak with certainty about it.

Figs. 4. and 5. Two needles for performing the operation of couching, by entering the inſtrument at the internal angle of the eye, and puſhing it out towards the other. By which means the operation may be done upon the right eye with the right hand; whereas, with the common ſtraight needle, the left hand muſt be uſed for the right eye; a degree of ſteadineſs, which ſome practitioners cannot always attain with the left hand.

All theſe inſtruments are delineated of a ſize fit for uſe. The handles ſhould be made of light timber, and the ſteel part of them poliſhed in the moſt exquiſite man-

ner. None of them ſhould exceed forty grains in weight, including that of the handle.

Plate XVI.

Fig. 1. A form of a knife for the operation of extracting the cataract. It ſhould be tolerably firm, and highly poliſhed. Near the point both ſides of the knife ſhould be ſharp, by which the cornea is more eaſily penetrated, but backwards the upper edge of it ſhould be round; which not only gives more ſtrength to the inſtrument, but makes the riſk leſs of hurting the iris.

Fig. 2. A knife of the ſame form in the cutting part of it with fig. 1. But by means of the bend, the operation may be performed on the right eye with the right hand of the ſurgeon.

Fig. 3. A knife commonly uſed in Germany in extracting the cataract.

Fig. 4. A ſmall ſcoop for removing either the whole body of the lens, or any part of it, when in extracting the cata-

ract

ract it happens to lodge either in the pupil or anterior chamber of the eye, between the iris and tranſparent cornea.

Plate XVII.

Fig. 1. A delineation of the eye with the couching needle inſerted into it.

Fig. 2. The knife employed for dividing the cornea in extracting the cataract, is here inſerted acroſs the eye, between the cornea and iris. And in fig. 4., the cut is delineated which ought to be formed in the cornea in the uſual method of performing this operation. Fig. 3. repreſents the cornea divided in the ſuperior part of it, in the manner I have mentioned in deſcribing the method of extracting the cataract.

Plate XVIII.

Fig. 1. A view of the right eye with one of the curved needles of Plate XV. inſerted into it; by which it is evident that a cataract may be couched in the right eye with the right hand of the ſurgeon.

Fig. 6. Repreſents a curved knife inſerted beneath the cornea in the operation of extracting the cataract with the right hand from the right eye.

Fig. 2. A ſharp-curved probe for removing the cataract, by making an opening behind the iris, in the manner I have adviſed in the Chapter on that operation.

Fig. 4. Small forceps, which may occaſionally be employed for the ſame purpoſe.

Fig. 5. A flat-curved probe, either of gold or ſilver, for inſerting through the pupil, in order to tear or form an opening in the capſule of the lens, ſo as to admit of an eaſy expulſion of the cataract.

Fig. 3. A tube of ſteel, with an edge ſufficiently ſharp for penetrating a hard bone, by which a portion of the os unguis, correſponding to the ſize of the tube, may be removed, when in the operation for the fiſtula lachrymalis this may be judged proper.

Plate XIX.

Fig. 1. An inſtrument for the purpoſe of compreſſing the lachrymal ſac. *AA*, a curved plate of ſteel covered with flannel or ſilk, and adapted to the forehead, upon which it is fixed by the ribands *CC*. *B*, Another plate of ſteel connected to the former; which paſſing back towards the occiput, ſerves to fix the machine with more certainty by means of the riband at its extremity. *D*, a ſmall moveable bar of ſteel, paſſing through an opening in the plate *AA*, to be firmly fixed at any particular height by the ſcrew *F*. *G*, a ſmall cuſhion or button of ſteel covered with ſilk or ſoft flannel; which being placed upon the corner of the eye immediately above the lachrymal ſac, any neceſſary degree of preſſure may be applied by means of the ſcrew *H*. The moveable bar *D* is ſeparated into two pieces by a ſcrew at *E*; ſo that by turning this ſcrew, the cuſhion *G* may be turned more or leſs outward at pleaſure, according to the par-

ticular form of the part on which it is to be applied.

The inſtrument here delineated is intended for the left eye; but it is eaſily made to anſwer the right eye, by moving the bar *D* into the ſlit or opening on the oppoſite ſide of the plate *AA*.

Fig. 2. A trocar and canula, for perforating the os unguis in the operation for the fiſtula lachrymalis.

Fig. 3. The ſtilette; and, fig. 4. the canula, repreſented ſeparately.

Fig. 5. A curved trocar; the inſtrument commonly employed for the fiſtula lachrymalis; but the ſtraight trocar, fig. 2. anſwers better.

Plate XX.

Fig. 1. A ſilver ſyringe, for the purpoſe of throwing liquids into the lachrymal paſſages. Fig. 4. A curved tube, adapted to the ſyringe, and of a proper ſize for being inſerted by the noſtril into the extremity of the naſal duct of the lachrymal ſac. Fig. 5. A ſmall tube, of a ſize correſponding

ſponding to the lachrymal puncta, for throwing injections through theſe openings into the ſac. Figures 6. and 7. Tubes of a larger ſize, for throwing liquids through the ſac into the noſe by an external opening, when this has either been made by an inciſion, or when the ſac has burſt, in conſequence of tears and matter collecting in it.

Figs. 2. 3. 8. 9. 10. and 11. Tubes of different forms, which have been employed in operating for the fiſtula lachrymalis, when the paſſage through the os unguis cannot in any other manner be kept free and pervious. Of theſe, however, figs. 3. and 10. are the beſt. The ſmall bulge with which they are formed, not only prevents them from paſſing through the opening altogether into the noſe, which cylindrical tubes are apt to do, but when they are once properly fixed, it prevents them from riſing againſt the ſkin, which they are otherwiſe ready to do. The tubes here repreſented, are of ſizes, both as to length and thickneſs, which anſwer for the moſt

moſt part of adults; but theſe are circumſtances which muſt depend upon the nature of every caſe, and will accordingly be liable to ſome variety. Tubes for this purpoſe ſhould be made of gold, poliſhed in the fineſt manner.

Plate XXI.

Fig. 1. A curved ſcalpel, employed by ſome practitioners for extirpating the eyeball. By its form it is ſuppoſed to be well ſuited for this purpoſe; but the common ſtraight ſcalpel I have repeatedly found to anſwer better.

Figures 2. 3. and 4. Curved probes, of a proper ſize for inſerting by the noſtril into the naſal duct of the lachrymal ſac, by thoſe who wiſh to clear theſe paſſages in this manner.

Fig. 5. and 6. Probes of a ſmaller ſize, for inſerting into the lachrymal puncta.

Plate XXII.

Fig. 1. The knife commonly uſed by Mr Pellier in extracting the cataract. It ſhould

ſhould be highly poliſhed, and ſo ſharp as to penetrate the eye with eaſe, at the ſame time that it ſhould be ſufficiently ſtrong for dividing the cornea without yielding. This, as well as the other two knives in this plate, are made to fit the handle repreſented in Plate XXIII. fig. 1.

Fig. 2. A knife exactly of the ſame form and ſize with the other; only in this, that ſide which paſſes next the iris is round or convex, with a view to protect that membrane from being injured, which it is apt to be when the common flat knife is employed in eyes that are not prominent.

Fig. 3. A probe-pointed knife, which in ſome caſes may be employed with advantage for finiſhing the operation, when by any accident the aqueous humour eſcapes before the point of the other knife has pierced the oppoſite ſide of the cornea: But for a more particular account of the method of uſing it, I muſt refer to what has been ſaid in deſcribing the different ſteps of the operation.

Fig.

Fig. 4. Curved ſciſſars of a proper ſize for every operation on the eyes where ſciſſars are needed: Indeed every practitioner who operates on the eyes ſhould have them.

Fig. 5. This is the only ſpeculum which Mr Pellier employs. It may be made of gold or ſilver wire, or of any other metal. It is here repreſented of a full ſize for adults, both in length and thickneſs of wire. In uſing it, one of the curves is placed upon the upper eyelid, directly behind the cartilaginous border; and being given to an aſſiſtant, a degree of force is applied with it ſufficient for fixing the eye; which is eaſily done, if the operator at the ſame time makes ſome reſiſtance, by placing the index and middle fingers of one hand on the under edge of the orbit, ſo as to compreſs the eye beneath.

All the inſtruments of this plate are repreſented of the full ſize.

Plate XXIII.

Fig. 1. A knife uſed by Mr Pellier in ſome caſes for extracting the cataract. It is fixed in the handle at *B* by a male-ſcrew, fitted to a female ſcrew, which is turned by the nut *A*. This handle may be made to anſwer figures 4. and 5. as well as every knife employed in operations of the eyes.

Fig. 2. An inſtrument for depreſſing the under eyelid. When an aſſiſtant cannot be procured, it may often prove uſeful. The two flat hooks at the upper end of it being fixed on the cartilaginous edge of the eyelid, the other end of it hanging over the cheek, by its weight draws it down.

Fig. 3. An inſtrument for determining the quantity of ſkin to be removed in operating for the Trichiaſis or Inverſion of the Eyelids. When it is found neceſſary to remove a portion of ſkin from beneath the under eyelid, or from the ſuperior part of the upper palpebra, it may be done with

with a common ſcalpel, while an aſſiſtant ſupports it from the parts beneath either with his fingers alone or with forceps made for the purpoſe; but this inſtrument anſwers better, as by means of it the quantity of parts to be removed can be aſcertained, and cut off with more preciſion.

Fig. 4. A knife for opening ſmall collections of matter on any part of the eyeball. Being blunt on the back, and round on the end, it is uſed without any riſk of injuring the contiguous parts.

Fig. 5. A ſharp-pointed curved knife for dividing the veſſels of the eye or of the palpebræ.

Theſe inſtruments are all delineated of the full ſize.

Plate XXIV.

Fig. 1. A curved needle fixed in a handle, for paſſing ligatures beneath the pterygium and other ſmall excreſcences ſometimes met with on the external ſurface of the eyelids, and not unfrequently on the eye itſelf. Fig. 1. is intended for tumors

mors on the right eye, and to be uſed with the left hand of the ſurgeon. Fig. 4. is for the left eye, to be uſed with the right hand.

Figs. 2. and 3. An inſtrument termed a Ciſtatome, being meant for opening the capſule of the cryſtalline lens. It may be made of gold or any other metal. It is held between the thumb and fore and middle fingers of the right hand, care being taken to place the thumb upon the button *A* or *C*, which is connected with a ſheath that covers the ſharp point *B*. The hand being ſupported on the cheek by the ring-finger and little finger, the point of the inſtrument covered with the ſheath muſt be cautiouſly paſſed through the pupil till it reaches the lens; when the button *C* being drawn back with the thumb, the point of the inſtrument is thus ſet at liberty, without the hand being moved. This is an ingenious invention, and anſwers the purpoſe with eaſe and ſafety.

Theſe inſtruments are all repreſented of the full ſize.

PLATE

Plate XXV.

Fig. 1. A ſmall ſcoop, which anſwers better than any other inſtrument for removing ſmall ſtones, peas, and ſuch like ſubſtances, from the noſtrils or ears.

Figs. 2. 3. 4. 5. and 6. Are inſtruments employed by Mr Pellier for the operation of the Fiſtula Lachrymalis. Fig. 2. is a perforator and conductor for clearing the paſſage through the os unguis into the noſe. Figs. 5. and 6. are tubes for leaving in the paſſage. Fig. 3. is a compreſſor for fixing them after they are inſerted; and the eaſieſt method of inſerting a tube is by putting it upon the conductor after it is paſſed through the compreſſor, as is repreſented in fig. 4. The conductor, armed with the tube and compreſſor, being paſſed through the paſſage into the noſe, muſt be withdrawn; when, by means of the compreſſor, the tube may be firmly fixed.

Theſe inſtruments are all repreſented of the full ſize.

Plate XXVI.

The figures in this plate repreſent inſtruments of Mr Wathen's for the cure of the fiſtula lachrymalis.

Figs. 2. and 3. A tube and tent for inſerting into the natural paſſage between the lachrymal ſac and the noſe: Theſe inſtruments may either be of lead, ſilver, or gold: When of ſilver or gold, it is neceſſary to have one or two turns of a female ſcrew in the top of the cup or cylinder; but not when formed of lead.

Fig. 4. The ſtile of the tube.

Fig. 5. The ſtile of the tent.

The ſtiles are meant to conduct their correſponding tubes and tents into the paſſage. And,

Fig. 1. A ſcrew ſtile for the purpoſe of removing the tubes or tents when neceſſary, for which purpoſe, however, ſmall forceps anſwer better.

Figs. 6. and 7. A tube and tent with a ſtring fixed to an aperture at the top of each.

Figs. 8. and 9. A tube and tent with a ſtile and ſtring united to each, and ready for uſe.

Theſe tubes and tents, Mr Wathen obſerves, are of the largeſt ſcale: There are two inferior ſcrews; the middlemoſt of which proves moſt generally applicable.

I have thus given a delineation of this part of Mr Wathen's apparatus, with which I doubt not that the fiſtula lychrymalis may be cured; but I conſider it in every part as inferior to what I have delineated in Plate XXV., both for the form of tubes and method of introducing them. For a more particular detail, however, than can be given here of the method of uſing Mr Wathen's apparatus, his book ſhould be conſulted; in which many valuable obſervations will be met with *.

PLATE

* Vide A New and Eaſy Method of curing the Fiſtula Lachrymalis; the ſecond edition, &c. By Jonathan Wathen Phipps, ſurgeon, London.

Plate XXVII.

Fig. 1. Mr Berenger's knife for the operation of extracting the cataract.

Fig. 3. Baron Wenſel's knife.

Fig. 4. Dr Richter's knife.

Fig. 2. A ſpeculum oculi, the invention of my friend Dr Wardrop, whoſe experience in diſeaſes of the eyes has been very extenſive.

This ſpeculum will be found very uſeful when the operator cannot have the aid of a good aſſiſtant. In ſcarifying the veſſels of the eye, this inſtrument anſwers the purpoſe of holding back the eyelids completely, and gives a ſufficient degree of ſteadineſs to the ball of the eye. The inſide of the eyelids are alſo turned outwards, at the ſame time that they are puſhed backwards, ſo as to expoſe the parts in the moſt complete manner.

The hinge ſhould be made very eaſy, that the operator may have little reſiſtance to overcome, and thus he will be

more ſenſible of the degree of preſſure to be made upon the eye. The other parts muſt be ſo firm as not to yield to any force that may be employed. The points of the forceps are connected with the ſemicircular pieces obliquely, to prevent the hand that holds the inſtrument from obſtructing the light.

Theſe ſemicircular parts ſhould be covered with thin leather that has ſome degree of roughneſs.

In uſing the inſtrument, it ſhould be placed ſhut upon the eyelids, and gradually opened as the eyelids are puſhed backwards: thereafter as much preſſure is to be made as may be found neceſſary.

Fig. 5. Small forceps, uſed by Baron Wenſel, for taking out the capſule of the lens, when in the operation of extracting the cataract it is found to be opaque.

Plates XXVIII. & XXIX.

The figures in theſe plates form a very uſeful part of the apparatus of an oculiſt. It is employed by Mr Biſchoff*.

All the figures of Plate XXVIII. repreſent a chair on which the patient is placed during the operation of extracting the cataract, by which his head is kept much more fixed and ſteady than it can poſſibly be in the uſual way, ſupported on the breaſt of an aſſiſtant; and as ſteadineſs is of the greateſt importance in all operations on the eye, the uſe of this chair may be extended to many others.

Figs. 1. and 2. Repreſent a ſtrong made chair, to which is faſtened a back *A*, which on each ſide by means of a ſcrew *B*, moves backwards and forwards. In the top *D*, which can at *C*, if neceſſary, be turned back, is a concave cloth cu-

* For a more particular account of this apparatus, ſee a Treatiſe on the Extraction of the Cataract, by Frederick Biſchoff, F. M. S. Oculiſt to his Majeſty in the Electorate of Hanover, and to her Majeſty in England.

ſhion for the greater ſecurity of the head, and to prevent it from ſlipping: Being made of a height to admit of the operator ſtanding, there are different pieces of wood, Plate XXIX. fig. 1. to put under the cuſhion, fig. 2.; each of theſe pieces of wood have two pegs *E F*, which fit correſponding holes in the ſeat of the chair: The cuſhion, fig. 2. Plate XXIX. is made in a wooden frame, to which is fixed two projecting pieces of iron, which go through the holes *E F* in the chair, fig. 2. Plate XXVIII. and faſten at the back, in the back-part of the chair with an iron peg, fig. 3. *H H*.

In fig. 3. Are two bars *I I*, to ſupport the top: *K* is a ſtand to prevent the top from falling, received into the notches *L*, which enable the operator, by their different diſtances, to incline the moveable top more or leſs backwards as he may find convenient.

Fig. 1. Plate XXIX. repreſents a very uſeful bandage for different operations on the eyes, particularly for the after-treatment

ment of the operation for the cataract. It conſiſts of a double piece of linen *A A*, about three fingers broad, and proportioned in length to the circumference of the head: At each end are fixed two ſtrings *B B* to tie it on the forehead: To this piece of linen are ſewed two pieces of double, dark-coloured ſilk or linen, *C C*, about ſix fingers ſquare, ſo that the piece which covered the diſeaſed eye ſhould be a little under the other piece, that no light may poſſibly reach the eye on which the operation has been performed; while ſome degree of light, if the operator thinks proper, may be admitted to the other.

Fig. 4. is a knife for extracting the cataract, nearly the ſame, although ſomewhat different from Dr Richter's, Plate XXVIII. fig. 4.

Plate XXX.

Fig. 1. Forceps of a convenient form for extracting ſmall bones or other ſubſtances from the throat.

Fig. 2. An inſtrument for preventing the noſtrils from collapſing after the operation deſcribed in Vol. IV. Chap. XII. Sect. IV. *AB*, Two moveable tubes for inſerting into the noſtrils, to be retained in their ſituation by a riband paſſed through the opening *CD*, and tied on the back-part of the head.

Fig. 3. A ſide view of one of the tubes.

Theſe inſtruments are all repreſented of the full ſize. They, as well as ſome others in this volume, are taken from ſome elegant engravings publiſhed by Mr Bambrilla of Vienna.

Fig. 4. A tube for the purpoſe of conveying a waxed ligature through one of the noſtrils into the fauces, when the ligature being drawn out at the mouth, a cuſhion or pad is attached to it, when it is drawn forcibly into the back-part of the noſe, for the purpoſe of putting a ſtop to hemorrhagies from the noſtrils that do not yield in any other manner. See Vol. IV. Chap. XII. Sect. II.

Plate XXXI.

Fig. 1. A double canula for fixing ligatures upon polypous excreſcences either in the noſe, throat, ears, or vagina. The ligature may either be of catgut or pliable ſilver-wire.

Fig. 4. Another canula for the ſame purpoſe. When the other is uſed, the ligature is tied round the handles of the inſtrument. In this the ligature paſſes through a moveable handle, and is eaſily turned to any degree of tightneſs.

Fig. 2. Is a canula of the ſame kind with the others; but being crooked, it is better calculated for removing polypi deeply ſeated in the throat. The method of uſing theſe inſtruments is deſcribed in different parts of Chap. XII. Sect. V.

Fig. 3. Is an inſtrument for paſſing a ligature over the uvula. A thread being paſſed through the tubular part of the handle with the probe *A*, a nooſe is then formed on it; and being lodged in the groove

groove on the inside of the ring, the other end of the thread is paſſed through the two ſmall holes on the outſides of the ring; and thus it is ready for uſe. This is commonly termed the Ring of Hildanus, from the name of its inventor. All theſe inſtruments are repreſented of the full ſize.

Plate XXXII.

Fig. 1. A ſection of the bones of the head, repreſenting a polypus in the throat hanging down behind the velum pendulum palati, with a ligature paſſed over it and fixed at the root of it, with a double canula inſerted through one of the noſtrils.

Fig. 2. This figure is taken from Mr Cheſelden. It repreſents a polypus in the noſe, with part of it paſſing back to the threat, and the reſt into the noſtril, with a ligature inſerted from the noſtril into the throat, in ſuch a manner as to include the root of the excreſcence in its doubling. By afterwards twiſting the ends of the ligature, a degree of compreſſion may be applied

applied upon the root of the polypus ſufficient for making it drop off; but it would not anſwer in every caſe; and as the method with the canula, Plate XXXI., is not only more eaſy but more effectual, the other will never probably be uſed.

Plate XXXIII.

Fig. 1. A polypus of ſuch a ſize that it filled the noſtril completely, and was removed with a ligature as is here repreſented. *A*, The extremity of the polypus which appeared without the noſtril. *C*, A probe of ſilver or any other metal, ſplit at the end, in ſuch a manner as to retain a piece of catgut or ſilver-wire; the doubling of which being inſerted into the ſlit, ſhould be puſhed up to the root of the polypus on one ſide, while the tube *B* being paſſed upon the two ends of it, muſt be puſhed up to the root of it on the oppoſite ſide, when the ligature may be eaſily drawn to any neceſſary degree of tightneſs.

Fig.

Fig. 3. A ſlit-curved probe, which may be uſed for the ſame purpoſe, namely, for applying a ligature to the root of a polypus in tumors ſeated in the throat. By this ſimple invention a ligature may be carried to the throat of almoſt every polypus that can occur.

Plate XXXIV.

Fig. 1. An inſtrument for applying cauſtic to any part of the mouth or throat. It may be made of ſilver or any other metal. *A*, A moveable tube in which the cauſtic is fixed, when by pulling the ring at the other end, it muſt be drawn ſo far into the ſurrounding canula as to be completely covered with it; when the end of the inſtrument being applied upon the part affected, the cauſtic muſt be again puſhed forward to a proper length, which may be always aſcertained with accuracy by means of the ſmall pin tied by a thread to the ring at the oppoſite end of it. This, as well as the inſtruments of Plate XXXIII. I am favoured with by Dr Monro, whoſe improvements

ments in ſurgery are numerous and important.

Figs. 2. 3. and 4. Are different parts of an inſtrument mentioned in Section V. Chap. XII. Vol. IV. for the purpoſe of putting a ligature round a polypus in the throat.

Fig. 2. A waxed thread with a nooſe adapted to the ſize of the groove in the ring *CD*, fig. 3. *ED*, *EC*, Two tubular pieces of braſs, each of which is two inches and a half long, ſupporting the ring which is placed horizontally upon them. At the upper ends of each they ſhould be made perfectly ſmooth and round, ſo as to allow the thread to ſlide eaſily, and to prevent it from being cut by the edges of the tubes. *CD*, The apertures where the ends of the thread are inſerted. *E*, One of the openings at which they are brought out. The other opening cannot be ſeen in this view of the inſtrument. The handle of the inſtrument is of ſtrong wire, ſeven or eight inches long, and bent a little that it may be the more eaſily introduced.

Fig.

Fig. 4. An inſtrument for making a ſecond nooſe. *F*, Two braſs wheels fixed in a ſmall caſe of braſs. The two wheels are five-eighths of an inch broad, and half an inch deep. After forming a ſecond nooſe, the ends of the thread ſhould be paſſed over the wheels in the manner here repreſented, when the handle of the inſtrument being puſhed upwards, a knot may be formed of any degree of tightneſs.

This inſtrument is evidently formed upon the ſame principle with the ring of Hildanus, Plate XXXI. fig. 3. and was the invention, I believe, of the late ingenious Mr Dallas, ſurgeon in Muſſelburgh.

Plate XXXV.

Fig. 1. Curved forceps for extracting polypi from the throat, and from behind the velum pendulum palati.

Fig. 2. Straight forceps for extracting polypi from the noſtrils.

Fig. 3. Forceps for the ſame purpoſe with the laſt, but ſomewhat different in form. The method of uſing both theſe

and

and the others, is deſcribed in Sect. V. Chap. XII. Vol. IV.

Plate XXXVI.

Figs. 1. 2. and 3. Different forms of curved ſciſſars, for extirpating tumors within the mouth, as well as for other purpoſes.

Fig. 4. An inſtrument nearly of the form of a fleme, which anſwers better than any other for ſcarifying the gums of children in dentition.

Plate XXXVII.

Fig. 1. A ſcarificator for ſeparating the gums from the roots of teeth intended to be extracted: It ſhould be very ſharp, but at the ſame time not ſo fine in the point or edge as to be hurt by being inſinuated between the gums and the teeth.

Fig. 2. A curved trocar for perforating the antrum maxillare.

Figs. 3. and 4. Two diſſecting hooks with two and three prongs, which anſwer better for

for many purpoſes than the ſingle pronged hook in common uſe.

Plate XXXVIII.

Fig. 1. An inſtrument for paſſing a ligature round the uvula or any other pendulous excreſcence in the throat; but although the propoſal is ingenious, it does not anſwer the purpoſe ſo well as the inſtruments delineated in Plate XXXI. figs. 1. 2. 3. and 4.

Fig. 2. An inſtrument firſt propoſed by Mr Cheſelden for tying a knot upon ſchirrous amygdalæ after paſſing a ligature through the baſis of the tumor, in the manner repreſented in fig. 3. The pin in fig. 2. is meant to repreſent a part upon which a knot is to be formed.

Plate XXXIX.

Fig. 1. An inſtrument for removing the uvula by exciſion. That part of the uvula intended to be removed being paſſed through the opening in the body of the inſtrument, the cutting ſlider, which ought to

to be very ſharp, muſt be preſſed forward with ſufficient firmneſs for dividing it from the parts above.

Fig. 3. A curved probe-pointed biſtoury, for removing ſmall tumors in the throat or any part of the mouth; and fig. 2. forceps for laying hold of tumors intended to be removed in this manner.

Plate XL.

Figs. 1. and 2. Two ſcarificators of different forms for opening abſceſſes in the throat, and for ſcarifying the amygdalæ. The two wings with which the canula of fig. 1. is furniſhed, are intended for compreſſing the tongue, while the point of the inſtrument is paſſed more deeply into the throat.

Figs 2. and 4. Mr Mudge's machine, for conveying ſteams of warm water and other liquids to the throat and breaſt. Fig. 2. The inhaler as it appears when fitted for uſe, except that the grating *A*, which then ought to cover the hole, is

now turned back, to ſhew the opening into the valve. Fig. 4. A ſection of the cover, in which is ſhewn the conſtruction of the cork-valve *B*, and alſo the conical part *C*, into which the flexible tube *D* is fixed.

When the inhaler, which holds about a pint, after being three parts filled with hot water, is fixed at the arm-pit under the bed-clothes, the end of the tube *E* is to be applied to the mouth; the air, in the act of reſpiration, then ruſhes into the apertures *F*, and paſſing through the hollow handle, and afterwards into a hole in the lower part, where it is ſoldered to the body, and therefore cannot be repreſented, it riſes through the hot water, and is received into the lungs, impregnated with vapour. In exſpiration, the contents of the lungs are diſcharged upon the ſurface of the water; and inſtead of forcing the water back through the hollow handle, the air eſcapes by lifting the round light cork valve *B*, ſo as to ſettle upon the ſurface of the body under the bed-clothes.

Thus

Thus the whole act of reſpiration is performed, without removing the inſtrument from the mouth.

The flexible part of the tube *D* is about ſix inches long, fitted with a wooden mouth-piece *E* at one end, and a part *G* of the ſame materials at the other, to be received into the cone *C* on the cover. This flexible tube is made by winding a long ſlip of ſilk oil-ſkin over a ſpiral braſs-wire; which is then covered with one of the ſame ſize, of thin ſilk, and both ſecured by ſtrong ſewing ſilk wound ſpirally round them. Some length and degree of flexibility is neceſſary to this tube, for the ſake of convenient accommodation to the mouth when the head is laid on the pillow.

Care ſhould be taken to make the cover fit very exactly; otherwiſe the defect ſhould be remedied by winding a piece of cotton-wick, or ſome ſuch contrivance, round the rim beneath the cover, ſo as to make it air-tight. The cork, likewiſe, which forms the valve, ſhould, for the ſame

ſame reaſon, be made as round as poſſible. It is alſo neceſſary to remark, that the area of the holes on the upper part of the handle taken together; the ſize of the hole in the lower part of the handle which opens to the inhaler; the opening of the conical valve itſelf; and that in the mouth-piece; as well as the cavity or inſide of the flexible tube, ſhould be all equally large, and of ſuch dimenſions, as to equal the ſize of both noſtrils taken together; in ſhort, they ſhould be ſeverally ſo large as not only not to obſtruct each other, but that reſpiration may be performed through them with no more labour than is exerted in ordinary breathing.